2014 - 2019
Capitol Region Natural Hazards Mitigation Plan Update

FINAL: September 1, 2014

FEMA Approved Pending Adoption August 29, 2014

FEMA Approved December 5, 2014

Cover Page Photo Credits (clockwise from top left): February 12, 2013 Blizzard, from *The Hartford Courant*; Aftermath of Hurricane Irene, August 2011, from *The Hartford Courant;* July 2, 2013 Tornado in Windsor, from www.nbcconnecticut.com; Simsbury Nod Road Flooding, 2006, from CRCOG files.

Acknowledgements

Representatives from the thirty member municipalities of the Capitol Region Council of Governments contributed to the development of this plan update. The following individuals served as the primary project contacts and led the efforts in each community. Numerous other municipal staff assisted them in the update. We thank all contributors for their input and work.

Robert Burbank, First Selectman, Town of Andover
Jamie DiPace, Emergency Management Director, Town of Avon
John Lawlor, Public Works Director, Town of Bloomfield
Joyce Stille, Administrative Officer, Town of Bolton
Adam Libros, Fire Marshal/Director of Emergency Management, Town of Canton
Gary Haynes, Director of Community Development, Town of East Granby
Marcia Leclerc, Mayor, Town of East Hartford
Roger Hart, Deputy Police Chief, Town of East Windsor
Robert Phillips, Town Planner (former), Town of Ellington
Lisa Houlihan, Acting Town Planner, Town of Ellington
Daniel Vindigni, Assistant Town Manager/EMD (former), Town of Enfield
Charles Grasso, Director Emergency Management, Town of Enfield
Paul Melanson, Police Chief, Town of Farmington
Michael Bisi, Superintendent of Sanitation, Town of Glastonbury
Francis Armentano, Director of Community Development, Town of Granby
Carlos Huertas, Fire Chief/Emergency Management Director, City of Hartford
William Kramer, Emergency Management Director, Town of Hebron
Matt Bordeaux, Environmental Planner, Town of Manchester
Donald Janelle, Deputy Director Emergency Management, Town of Manchester
Catherine Gaudinski, First Selectman, Town of Marlborough
Judy Ceramicoli, Administrative Assistant, Town of Marlborough
Christopher Schroeder, Fire Chief/Emergency Management Director, Town of Newington
Ray Carpentino, Economic Development Director, Town of Rocky Hill
Richard Sawitzke, Town Engineer, Town of Simsbury
Lisa Pellegrini, First Selectman, Town of Somers
Jeffrey Bord, Director of Public Works/Town Engineer, Town of Somers
Fred Shaw, Superintendent of Pollution Control, Town of South Windsor
Richard Shuck, First Selectman, Town of Stafford
Dennis Milanovich, Town Engineer/Building Official, Town of Stafford
Michael Wilkinson, Director of Administrative Services, Town of Tolland
John Littell, Fire Chief/ Director of Public Safety, Town of Tolland
Michael Purcaro, Emergency Management Director, Town of Vernon
Gary Allyn, Fire Chief, Town of West Hartford
Michael Turner, Director of Public Works/Town Engineer, Town of Wethersfield
Paul Goldberg, Fire Administrator, Town of Windsor
Jennifer Rodriquez, Town Planner, Town of Windsor Locks
Patrice Carson, Consulting Town Planner, Town of Windsor Locks

We also thank Karen Michaels, Environmental Analyst, Connecticut Department of Energy and Environmental Protection, and Mary Rose Duberek, Connecticut Division of Emergency Management and Homeland Security, for their advice and assistance throughout the project.

The following CRCOG employees contributed to the development of this plan update:

Lyle Wray, Executive Director
Mary Ellen Kowalewski, Director of Policy Development and Planning
Cheryl Assis, Director of Public Safety and Homeland Security
Winsome Barnaby, Finance Director
Lynne Pike DiSanto, Senior Planning and Policy Analyst
William Perkins, Trainer and Homeland Security Project Coordinator
Pramod Pandey, Senior Transportation Planner/GIS Analyst
Maureen Barton, Program Assistant
William Austin, CERPC Coordinator
Rory Fitzgerald, Intern

Questions or comments regarding this Plan Update should be directed to:

Lynne Pike DiSanto, AICP
Senior Planner and Policy Analyst
Capitol Region Council of Governments
241 Main Street, 4th Floor
Hartford, Connecticut 06106
(860) 522-2217 ext. 211
lpikedisanto@crcog.org

Acronyms and Abbreviations

Acronym	Definition
BCR	Benefit-Cost Ratio
BFE	Base Flood Elevation
BOCA	Building Officials and Code Administration
CGS	Connecticut General Statute
CAO	Chief Administrative Officer
CEO	Chief Elected Official
CEQ	Connecticut Council on Environmental Quality
CIP	Capital Improvements Program
CL&P	Connecticut Light & Power Company
CLEAR	Center for Land Use Education and Research
CRCOG	Capitol Region Council of Governments
CRS	Community Rating System
CSO	Combined Sewer Overflow
DEMHS	Connecticut Division of Emergency Management and Homeland Security
DEEP	Connecticut Department of Energy and Environmental Protection
DESPP	Connecticut Department of Emergency Services and Public Protection
DMA 2000	Disaster Mitigation Act of 2000
DOT	Connecticut Department of Transportation
DPH	Connecticut Department of Public Health
DPW	Department of Public Works (or Director of Public Works)
EOC	Emergency Operations Center
EOP	Emergency Operations Plan
ESF	Emergency Support Function
FEMA	Federal Emergency Management Agency
FHBM	Flood Hazard Boundary Map
FHMP	Flood Hazard Management Plan
FIRM	Flood Insurance Rate Map
FMA	Flood Mitigation Assistance
FMP	Flood Management Program
FPMS	Floodplain Management Studies
GIS	Geographic Information System
GPS	Global Positioning System
HMA	Hazard Mitigation Assistance
HMGP	Hazard Mitigation Grant Program
IA	Individual Assistance
IBC	2003 International Building Code
IT	Information Technology
LID	Low Impact Development

LOMA	Letter of Map Amendment
MDC	Metropolitan District Commission
MOU	Memorandum of Understanding
NDDB	Natural Diversity Data Base
NEMO	Nonpoint Education for Municipal Officials
NFIP	National Flood Insurance Program
NFPA	National Fire Protection Association
NGVD	National Geodetic Vertical Datum of 1929
NHMP	Natural Hazard Mitigation Plan
NOAA	National Oceanic & Atmospheric Administration
NRCS	National Resources Conservation Service
NU	Northeast Utilities
OEM	Office of Emergency Management
OPM	Connecticut Office of Policy and Management
NIMS	National Incident Management System
PA	Public Assistance
PDM	Pre-Disaster Mitigation Program
POCD	Plan of Conservation and Development
RCC	Regional Coordinating Center
RESP	Regional Emergency Support Plan
RPA	Regional Planning Agencies
RPO	Regional Planning Organization
SBA	U.S. Small Business Administration
SCEL	Stream Channel Encroachment Line
SHMO	State Hazard Mitigation Officer
SHPO	State Historic Preservation Office
SHSGP	State Homeland Security Grant Program
STAPLEE	Social, Technical, Administrative, Political, Legal, Economic, Environmental
SSO	Sanitary Sewer Overflow
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USDHS	U.S. Department of Homeland Security
USGS	U.S. Geological Survey
WUI	Wildland/Urban Interface

Capitol Region Natural Hazards Mitigation Plan Update
2014 – 2019
Executive Summary

Introduction

Connecticut's Capitol Region encompasses the City of Hartford and twenty-nine surrounding suburban and rural communities. The Capitol Region Council of Governments (CRCOG) received Federal Emergency Management Agency (FEMA) funds through the Connecticut Department of Energy and Environmental Protection (DEEP) to develop a Natural Hazard Mitigation Plan Update for the thirty municipalities comprising the region:

City of Hartford	Town of Enfield	Town of Somers
Town of Andover	Town of Farmington	Town of South Windsor
Town of Avon	Town of Glastonbury	Town of Stafford
Town of Bloomfield	Town of Granby	Town of Suffield
Town of Bolton	Town of Hebron	Town of Tolland
Town of Canton	Town of Manchester	Town of Vernon
Town of East Granby	Town of Marlborough	Town of West Hartford
Town of East Hartford	Town of Newington	Town of Wethersfield
Town of East Windsor	Town of Rocky Hill	Town of Windsor
Town of Ellington	Town of Simsbury	Town of Windsor Locks

CRCOG staff and municipal officials from each community contributed to this planning project. The Capitol Region Emergency Planning Committee (CREPC) ESF-5 Emergency Management subcommittee was expanded to provide guidance to the update process. This plan update builds on the existing Pre-Disaster Natural Hazard Mitigation Plan of 2008. (All of the communities listed above except Stafford, which joined the Capitol Region in 2010, participated in the 2008 Plan.) The purpose of this plan is to identify natural hazards likely to affect the Capitol Region and its nearly 770,000 residents, assess our vulnerabilities to these hazards and set forth mitigation strategies that will reduce the loss of life and property, economic disruptions and the cost of post-disaster recovery for the region's communities. The benefits of preparing a Natural Hazards Mitigation Plan include:

- Improving the region's ability to deal with natural disasters and reduce losses
- Reducing the need for emergency response to natural disasters
- Enabling municipalities to access FEMA Hazard Mitigation Assistance Grants upon formal adoption of an approved plan
- Improving post-disaster recovery implementation

The plan considers the following natural hazards that affect the region:

- Dam failure
- Drought
- Earthquake
- Flooding
- Forest and Wild Land Fires
- Hurricanes and Tropical Storms
- Tornados and High Winds
- Severe Winter Storms

The impacts of these natural hazards were evaluated as well as the locations and groups of people particularly vulnerable to the effects of these hazards. Mitigation goals and strategies were developed at both the regional and local levels to reduce or prevent the damages to life and property that can result from these natural hazards. CRCOG and CREPC, in addition to local and other partners, are responsible for implementation of the regional goals contained in this plan. Each participating municipality identified its own mitigation goals and strategies and assumes responsibility for implementation of those measures.

Hazards Impacting the Capitol Region

The Capitol Region is vulnerable to the numerous natural hazards with flooding, winter storms and high wind events being the natural hazards that most frequently occur with enough severity to cause loss of life or property. To evaluate the impacts of these hazards on our region, we looked at historical accounts of major storms and other events; examined flood insurance claims data and public assistance provided after federally declared disasters; analyzed demographic data and physical features; and used a computer model to estimate losses due to flooding, hurricanes and earthquakes. The following is a brief summary of the natural hazards affecting the region and our communities.

Hurricanes and Tropical Storms

The Atlantic hurricane season extends from June 1st through November 30th each year. While the Capitol Region is spared the coastal storm surges associated with hurricanes, it is not immune from damaging winds and rain. According to the State's Hazard Mitigation Plan, a moderate Category II hurricane can be expected to hit Connecticut once every twenty-three to thirty years. A major Category III or IV hurricane may occur before 2040, based on 20th century trends.

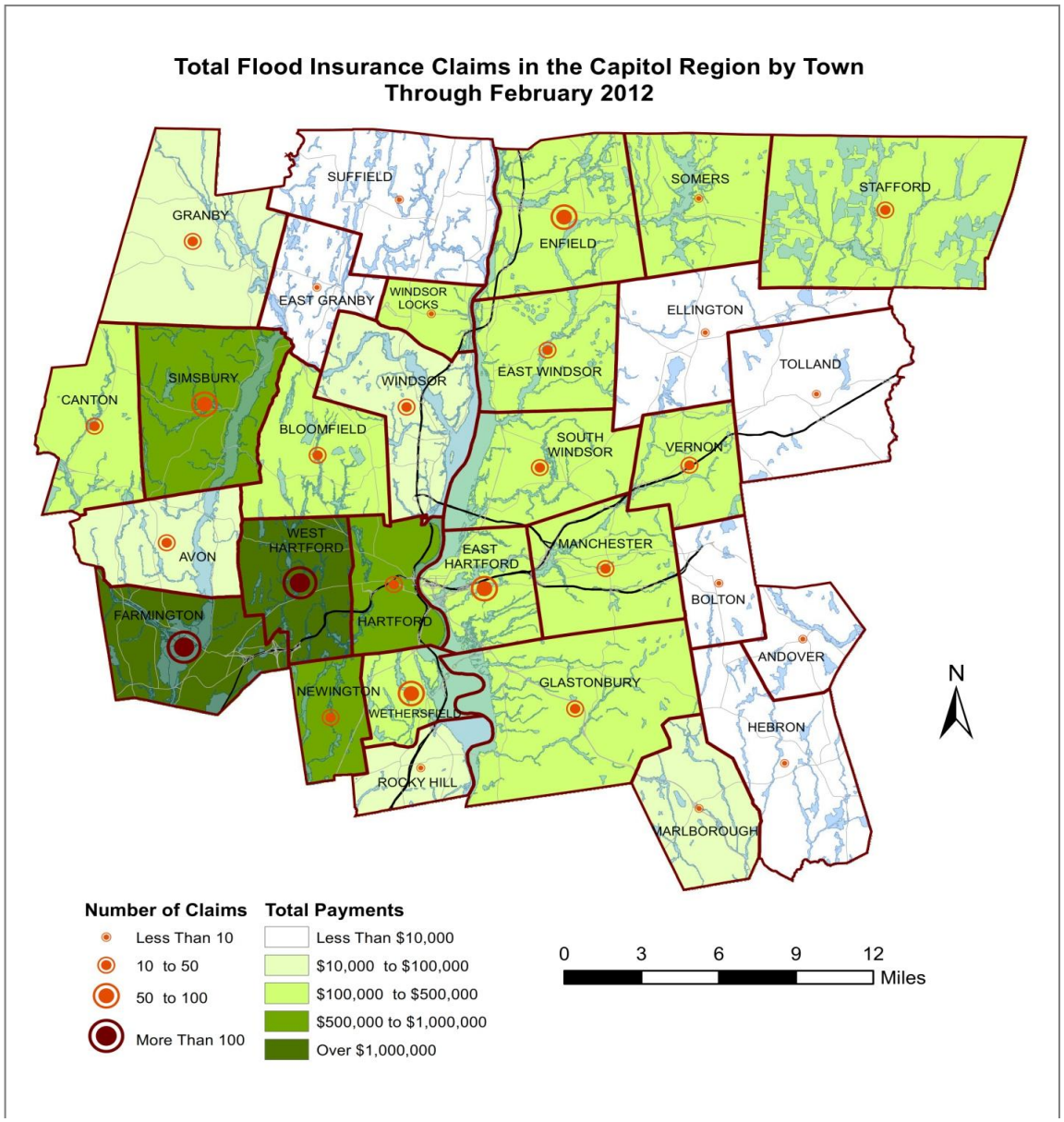
In August 2011, Hurricane Irene, which was downgraded to a tropical storm before hitting Connecticut, caused widespread damage to the region and state. Irene was responsible for three deaths associated with flooding and downed wires from falling trees. According to *The Hartford Courant*, insurance companies paid out $235 million on more than 60,000 claims in Connecticut related to damage from Irene. However, this figure does not include hundreds of millions more in uncovered expenses and clean up costs for Connecticut's largest electric utility, Connecticut Light and Power. At the height of the storm some 754,000 residents were without power. Capitol Region cities and towns were widely affected by downed trees, flooding and power outages as a result of Irene. Many residents and businesses were without power over a week. According to the Connecticut Division of Emergency Management and Homeland Security, municipalities, other local and private nonprofit agencies incurred expenses of over $3.18 million due to Irene. The municipalities and agencies are eligible for reimbursement of 75% of these costs under FEMA's Public Assistance program.

CRCOG used FEMA's Hazus-MH software to estimate the extent of physical damage and the economic losses to the region and our communities if we were hit with another hurricane similar to the Category III hurricane of 1938. The Hazus-MH hurricane model primarily considers wind damage for inland areas such as the Capitol Region which are not subject to storm surges. The model predicts the region could face economic losses of over $3.6 billion and nearly 26,000 buildings with moderate or greater damage as a result of such a storm.

Floods

Flooding can occur as a result of other natural hazards such as heavy precipitation, hurricanes, winter storms, snow melt, ice jams or dam failures. The Capitol Region's numerous rivers and streams, as well as its urbanized areas, make floods and flash floods a regular risk. Individuals and local governments face significant economic

loss, risks to public safety, and degraded waterways from flooding. There is not a "flood season" per se in Connecticut; however, waterways are normally higher during spring, and are thus especially vulnerable to flooding from intense precipitation. Significant flooding can also occur as a result of hurricanes and tropical storms. According to the State's Plan, major flooding of small rivers and loss of life can be expected every 5-10 years throughout the State. Major flooding of larger rivers, such as the Connecticut and Farmington, with loss of life and structural damage can be expected once every 30 years. Historic and widespread floods occurred in 1936, 1938, 1955, and 1982.



An analysis of claims filed under the National Flood Insurance Program in the Capitol Region demonstrates the potential for losses due to flooding. Since the program's inception, over 1,200 claims resulting in payments of nearly $7.8 million have been filed in the Capitol Region as of February 2012. Of these claims, 287 were repetitive loss claims (i.e., more than one claim over $1,000 has been filed for flood damages to an

insured building over a ten year period). Nearly 100 properties have experienced repetitive losses in the Capitol Region. These losses have resulted in payments of over $3.5 million. West Hartford and Farmington have had the highest overall and repetitive flood loss claims.

To help assess the risks we face from major flooding, CRCOG used FEMA's Hazus-MH loss estimation program to model the effects of flooding at the local level. The following table shows the damages each town in the region might face from a flood with a 1% probability of occurring in any given year (i.e., the 100 year flood). As can be seen, losses could be expected to be particularly high for Farmington River Valley communities.

Municipality	Total Estimated Economic Losses from a 1% (100 Year) Flood	Buildings at Least Moderately Damaged	Municipality	Total Estimated Economic Losses from a 1% (100 Year) Flood	Buildings at Least Moderately Damaged
ANDOVER	$10,290,000	8	MANCHESTER	$64,350,000	11
AVON	$179,770,000	114	MARLBOROUGH	$5,170,000	2
BLOOMFIELD	$21,720,000	30	NEWINGTON	$15,730,000	23
BOLTON	$1,970,000	0	ROCKY HILL	$4,740,000	1
CANTON	$52,170,000	34	SIMSBURY	$102,150,000	135
EAST GRANBY	$13,340,000	13	SOMERS	$12,790,000	10
EAST HARTFORD	$33,550,000	41	SOUTH WINDSOR	$33,240,000	48
EAST WINDSOR	$17,970,000	26	STAFFORD	$50,620,000	27
ELLINGTON	$11,120,000	0	SUFFIELD	$24,030,000	12
ENFIELD	$91,120,000	135	TOLLAND	$13,400,000	11
FARMINGTON	$228,470,000	393	VERNON	$50,460,000	76
GLASTONBURY	$35,720,000	10	WEST HARTFORD	$130,710,000	140
GRANBY	$42,450,000	66	WETHERSFIELD	$20,960,000	7
HARTFORD	$206,450,000	61	WINDSOR	$132,710,000	292
HEBRON	$4,400,000	0	WINDSOR LOCKS	$2,420,000	

Significant areas of the Capitol Region are vulnerable to flooding. Over 9% or 48,883 acres of the Capitol Region is located in flood plains. Over half of this land is zoned residential. Without restrictions on development in flood plains, lives and property are at risk.

Dam Failure

Dams provide vital benefits to our region such as water supply, power generation, flood control, and recreation, but in the event of failure, they can pose a threat to lives and property. Dam failure can happen for a number of reasons including as a result of natural disasters such as structural failure due to earthquakes or overtopping due to heavy precipitation. Dams in Connecticut are regulated by the Department of Energy and Environmental Protection (DEEP). According to the DEEP, there are 533 dams in the Capitol Region. Of these, 38 are Class C, or high hazard, dams. Failure of a Class C dam would result in probable loss of life, major damage to habitable structures, damage to major highways and great economic loss. The region also has 59 Class B, or significant hazard, dams. Failure in these dams would result in similar, but less severe damage. The State estimates there are nearly 12,000 people in Hartford County and 4,150 people in Tolland County within

the mapped dam inundation areas of high and significant hazard dams. The Capitol Region does not include all municipalities in Hartford and Tolland Counties thus the regional population exposed to this risk is likely lower, probably under two percent.

Severe Winter Storms

Connecticut is subject to blizzards, ice storms and nor'easters - storms characterized by strong, possibly damaging northeasterly winds. The Capitol Region receives an average annual snowfall of about 40", although snowfall amounts vary widely from year to year and can vary dramatically across the Region in any given storm. Severe winter storms can result in damage to buildings and infrastructure, loss of life, and disruptions to regional transportation and communication systems. Half of all federal disaster declarations for Connecticut over the past 20 years have followed major winter or snow storms. Federal assistance is frequently used to offset the snow/ice removal costs the State and municipalities incur. For example, a federal emergency was declared for the February 11-12, 2006 snowstorm in several counties in Connecticut (including Hartford and Tolland) to help share the costs of snow removal. In 2011, FEMA obligated over $74 million in Public Assistance funds to the State of Connecticut to reimburse state agencies, local governments and eligible private nonprofit organizations for costs associated with the January 11-12, 2011 snowstorm and Storm Alfred in October. The frequency, intensity and timing of winter storms dramatically impacts snow removal budgets. Storm Alfred was particularly costly for municipalities because of the heavy debris loads resulting from the high number of fully leafed trees downed in this storm. Municipalities also incur higher labor costs for snow removal on weekends and holidays.

Tornados/High Winds

Connecticut averages approximately three tornadoes every two years; however, in the first week and a half of July 2013 four tornadoes hit the State including three which touched down in the Capitol Region. Hartford and Litchfield Counties are at the highest risk for tornadoes within the state based on historical patterns and locations of their occurrence. Between 1950 and 2003, Hartford County experienced 14 tornadoes and Tolland County experienced 10. Between 2006 and 2012, Connecticut experienced twelve tornados. Two of these were in Hartford County (Wethersfield and Bristol) and one in Tolland County (Somers). Typically, tornadoes occur between April and October. High winds and microbursts (strong straight-line downburst winds) can also inflict damage to property and result in injuries.

One of the country's most destructive tornadoes touched down in Windsor Locks and Windsor on October 3, 1979. The F4 tornado had winds in excess of 200 miles per hour, and tore an 11-mile path from Windsor to Suffield. The tornado killed 3 people, injured 500 and caused an estimated $250 million ($776,385,000 in 2011 dollars) in damage, in part because it struck the New England Air Museum destroying several planes and hangars.

Earthquake

Connecticut has a moderate risk of earthquakes based on the frequency of their occurrence, not the intensity of individual earthquakes. Between 1568 and 1989, the state had 137 recorded earthquakes. The Capitol Region experienced sixteen between 1837 and 2012. Of those where the magnitude was known, all were under magnitude 4.0. A strong earthquake centered in central Connecticut and thought to be 3.8 magnitude occurred on August 9, 1840.

Magnitude 3.0 to 3.9 earthquakes are often felt by people up to a hundred miles away from the epicenter but rarely cause damage. Magnitude 4.0 to 4.9 earthquakes cause shaking of objects indoors but generally cause none to slight damage. Magnitude 5.0 to 5.9 earthquakes can cause moderate to major damage to poorly constructed buildings but none to slight damage to other buildings. Connecticut incorporated building codes for seismic activity into the state building code in 1992. There were no requirements prior to that. So, while the risk for a very damaging earthquake is relatively low in the region, some structures may be impacted by less intense earthquakes depending on the soil and integrity of the structure.

Using FEMA's Hazus-MH software, CRCOG analyzed several earthquake scenarios to estimate the potential loss to property and life. One scenario run was based on a 1998 5.2 magnitude earthquake centered in Pennsylvania and the results were typical for the modeling of historic earthquakes: No buildings or transportation and utility infrastructure were estimated to be damaged as a result of such an earthquake here. No fires were expected to result and no debris was expected to be generated as a result of the earthquake. Also, no injuries, deaths or displacements were expected to result from the quake. There were no economic losses estimated from such an earthquake scenario here.

We also ran a simulation of a magnitude 5 earthquake with an epicenter in Hartford. Such an earthquake would be stronger than we would expect based on historical evidence and has a low probability of occurring. An earthquake of this magnitude, however, would inflict considerable damage on the Capitol Region. Hazus estimates that over 12% of the buildings in the region or about 30,700 buildings would be at least moderately damaged and nearly 1,000 buildings would be damaged beyond repair. Four hospitals, 89 schools, seven police stations, five fire stations and two emergency operations centers would suffer at least moderate damage although none would be completely damaged. Thirty bridges would be expected to be moderately damaged and one completely damaged. Numerous leaks and breaks in water, wastewater and natural gas lines would be expected. Power outages would be widespread. Four fires are estimated to be ignited due to the earthquake resulting in about $3 million in building losses. Depending on the time of day that the earthquake struck, 40 to 85 deaths could be expected. Thousands of people would sustain minor injuries and hundreds would need hospitalization. Total economic losses estimated for such an earthquake would be $6.57 billion. Total building related losses were estimated at $5.51 billion with 47% of these losses attributed to residential properties.

If a 5.0 magnitude earthquake were centered in Moodus, an area of historic "rumblings," the effects on the Capitol Region would be considerably less severe. We ran a Hazus simulation of such an earthquake and found that only 1% of the buildings in the Capitol Region or about 2,200 buildings would be at least moderately damaged. Nearly 15 buildings in the region would be damaged beyond repair. No hospitals, schools, police stations, fire stations, emergency operations centers or bridges would suffer at least moderate damage and none would be completely damaged. Some leaks and breaks in water, wastewater and natural gas lines would be expected but no power outages would be expected. Only one fire is estimated to be ignited due to the earthquake. One death would be expected. About 40 people would sustain minor injuries and only a few would need hospitalization. Total economic losses estimated for the earthquake would be about $300 million. Total building related losses were estimated at $272 million with over 55% of these losses attributed to residential properties.

These simulations highlight the significance of the location of the epicenter to the damages that could be expected. A moderately strong earthquake centered near a more populated, built up area would be expected to result in considerably more damage than one located in a more remote area. Based on our history and

geology, the Capitol Region's vulnerability to damaging earthquakes is low. The damages we are likely to face here from earthquakes are much lower than in other parts of the nation and world.

Drought

Droughts periodically occur in Connecticut and can have serious consequences. While a drought does not pose immediate threats to life and property, it can have severe economic, environmental and social consequences. A lack of precipitation can affect not only agricultural production, but also tourism, water utilities, residential wells, businesses and more. Connecticut experienced notable droughts in 1957, 1964-67, 1980-81 and 2002. During the 2002 drought, several water utilities imposed mandatory water conservation and restriction measures on their customers, while most other companies imposed voluntary restrictions. Such restrictions can impact businesses as well as residences.

A meteorological drought was most recently declared for Hartford, Tolland and Windham Counties from April 12 through April 24, 2012 due to precipitation levels that were approximately half of normal levels. According to the NOAA Storm Events Database, rivers and streams were most affected as most ran at record low levels during the spring run-off season. The State did not issue a drought declaration, however, as reservoirs were at normal levels, thanks largely to above normal precipitation falling between August 2011 and November 2011. The main impact of this meteorological drought was periods of very high fire danger. Rainfall in the first half of 2013 has been higher than normal and drought seems unlikely for the near future. However, as the State's draft Natural Hazards Mitigation Plan Update notes, predicting the future occurrences of drought within any given time period is difficult.

Forest and Wildland Fires

Forest or wildland fires can cause not only long-term damage to vegetation and ecosystems, but also damage to developments, especially as residential development has increased in woodland areas. In the last twenty years, a few forest fires have occurred in the Capitol Region including a fire in May 1995 which burned nearly 40 acres in Tolland; a brush fire in April 1999 in Vernon which also burned about 40 acres and came within 100 feet of homes in a nearby neighborhood; and a fire in April 2005 which burned eight acres along the Farmington River in Avon. The scale of these fires is much less than those experienced in the western and midwestern United States; nonetheless forest fires here pose a risk to lives and property especially at the urban/woodland interface.

Mitigation Strategy

To address the impacts of these natural hazards, the planning committee and local and regional staff reexamined the goals, objectives and strategic mitigation activities proposed in the 2008 Plan as well as assessed our experiences with natural disasters of the last five years and considered input from the public and other stakeholders in order to develop a blueprint for better protecting our region over the next five years. Each mitigation action was prioritized and responsible agencies, potential funding sources and time frames for implementing the projects were identified. What follows is a brief outline of the regional and local strategies proposed.

We categorized the individual projects and actions proposed by the region and municipalities into the following types of measures:

Education & Awareness – Projects and actions in this category include measures to inform and educate local residents and businesses, elected and appointed officials, and other stakeholders. Types of outreach include general public informational outreach efforts such as use of local websites to post information, mailings with tax statements, newspaper advertisements, press releases, e-mail blasts, etc. Other measures in this category include targeted outreach efforts to specific groups which could include more direct contact such as meetings. Also included are workshops, forums, fairs, seminars and the like.

Natural Resource Protection – Actions included in this category are those that not only minimize hazard losses but also can preserve or restore functions of natural systems such as stream corridor restoration, watershed management, wetlands preservation and restoration, and timber management.

Preparedness and Enhancement of Emergency Response – Actions in this category may not be thought of as directly tied to mitigation of damage due to natural disasters but they are measures vital to public safety and the restoration of normalcy in a community. In this regard, they play an important role in the reduction of losses a community will experience. Measures in this category include improving working relationships and coordination between agencies; securing new equipment, facilities, supplies and personnel to aid in emergency response; improving procedures related to emergency response; conducting emergency response training; and improving communications systems.

Prevention – Activities in this category generally include government actions or processes that influence the way land and buildings are developed, such as zoning regulations, floodplain regulations, building codes, open space preservation, and stormwater regulations. Also included are studies and assessments of risks and vulnerabilities including identifying and improving a community's ability to contact vulnerable populations; improving mapping and data analysis capabilities; and undertaking engineering studies to address drainage, flooding, and power outage issues. Other government actions and programs such as implementing procedures for improving operations, using tax incentives and capital improvement programming are also included in this category.

Structural Projects/Property Protection & Modifications – Activities in this category include modifications and retrofits of existing buildings, structures and infrastructure to protect or remove them from harm such as acquisition, relocation, elevation, flood proofing, installation of shatter proof glass, relining culverts, strengthening roofs, etc. Measures in this category could also include new construction or reconstruction projects to reduce the impact of hazards such as installation of improved drainage facilities, culverts, and other stormwater controls as well as undergrounding utilities. Expanding sheltering capacity and installation of backup power to critical facilities are other measures included in this category.

Regional Goal, Objectives and Mitigation Actions

Because of the regional nature of natural hazards and common concerns, some mitigation activities are better addressed at the regional level; however, the means to carry out certain activities may not be available to regional agencies, but are available to municipalities. For example, CRCOG cannot enact laws and regulations, levy taxes, or enter into construction contracts. This section establishes our regional strategy for addressing natural hazards and sets out the mitigation actions that may best be undertaken on a regional level.

Goal: Minimize the loss of life and property, and economic disruptions that can result from natural hazards.

Objective 1: Improve stormwater management and ground water recharge throughout the region to prevent increased flooding and lessen the effects of drought.

Mitigation Actions:

1.1 Encourage all municipalities in the Region to adopt regulations that incorporate or refer to recommended practices from the most current Connecticut Stormwater Quality Manual, Connecticut Guidelines for Erosion and Sedimentation Control and in particular, those which promote low impact development and green infrastructure techniques.

1.2 Encourage development that is in harmony with natural drainage systems in all municipalities through reviews of development referrals.

1.3 Foster improved understanding of the importance stream management, maintenance of natural drainage channels, and use of green infrastructure practices among municipal staff, inland wetlands commissions and planning and zoning commissions through education.

1.4 Continue participation with other regional planning agencies in Connecticut and Massachusetts in the Connecticut River Bi-State Partnership and, in particular, in the development of a Connecticut River Bi-State Corridor Management Plan.

Objective 2: Assist municipalities in implementing hazard mitigation strategies.

Mitigation Actions:

2.1 Work with member municipalities to maintain this regional natural hazard mitigation plan with updates at least every five years.

2.2 Work with member municipalities, state and federal agencies to improve availability of relevant data; including, but not limited to current land uses, vulnerable building stock inventories and values, and hazardous materials inventories.

2.3 Train CRCOG staff in HAZUS-MH software.

2.4 Assist member municipalities in pursuing federal and state funds to implement mitigation measures.

2.5 Incorporate natural hazard mitigation concerns into the regional plan of conservation and development and encourage municipalities to address natural hazards mitigation in local plans of conservation and development.

2.6 Encourage municipalities to participate in the National Flood Insurance Program's Community Rating System.

2.7 Work with municipalities to facilitate a process for improved communications with upstream communities to provide timely downstream notifications regarding water levels and releases from dams.

2.8 Encourage municipalities to increase their citizens' awareness and use of the Get Ready Capitol Region website. (http://www.getreadycapitolregion.org/)

2.9 Encourage FEMA to recognize the cumulative effect of winter storm events

2.10 Assist member communities in efforts to develop and maintain lists of functional needs populations and in improving involvement of functional needs persons in planning and training for hazard mitigation.

Objective 3: Assist municipalities in minimizing risks associated with power disruptions.

Mitigation Actions:

3.1 Monitor state efforts to assist municipalities in working with Connecticut Light & Power concerns over appropriate utility right-of-way maintenance, emergency response and the burial of transmission lines.

3.2 Encourage the installation of generators at critical facilities and in developments serving the elderly or special need populations through outreach and associated work with local officials.

Objective 4: Assist municipalities in minimizing risks associated with droughts.

Mitigation Actions:

4.1 Assist municipalities that do not currently have drought ordinances in enacting such ordinances to enable the enforcement of water conservation.

4.2 Assist in disseminating drought-related information by encouraging municipalities to post drought-related information released by the Connecticut Division of Emergency Management and Homeland Security or Connecticut Department of Public Health through their websites and/or newsletters, and by posting drought-related information on the Get Ready Capitol Region website.

Municipal Goals, Objectives and Mitigation Actions

Each of the thirty municipalities in the Capitol Region also reassessed its goals, objectives, and strategic mitigation actions from the 2008 Plan, and developed a new strategic course of action for the upcoming five years. In all, some 400 specific mitigation actions and projects are proposed. While many are unique to the individual communities, there are commonalities among the actions proposed, and all communities have proposed a range of activities including public education and awareness; natural resource protection; plans, studies and regulatory actions; structural projects and modifications to buildings, facilities and infrastructure; as well as measures to improve preparedness and emergency response. The table which follows summarizes these actions and projects.

Summary of Types of Mitigation Projects Proposed by Community

	Education & Awareness			Natural Resource Protection		Preparedness (Enhance Emergency Response)					Prevention				Structural Projects – Property Protection & Modifications			
Municipal Strategic Mitigation Actions, Processes, Projects	Informational Public Outreach	Targeted Outreach	Workshops and Forums	Preserve & Restore Natural Functions	Timber Management	Improve Coordination & Working Relationships	Improve Procedures	New Facilities, Equipment, Supplies, Personnel	Training	Improve Communications Systems	Assess Risks & Vulnerabilities	Assess/Protect Vulnerable Populations	Processes to Mitigate Damages to Life & Property	Strengthen Planning & Development Regulations	Acquisition/Relocation	Improve Drainage, Culverts, Roads & Bridges	Protect/Improve Utility Infrastructure	Strengthen/Protect Critical Facilities
Andover	X	X				X		X	X	X		X	X					X
Avon	X					X	X		X	X	X		X	X				X
Bloomfield	X							X	X	X			X			X		
Bolton	X			X		X				X	X		X			X	X	
Canton	X					X					X	X	X	X	X			
East Granby				X			X			X	X	X	X	X				
East Hartford	X		X						X	X	X	X	X			X		X
East Windsor	X			X		X		X	X		X	X	X			X		X
Ellington	X	X										X	X	X		X		X
Enfield	X							X		X	X	X	X	X		X		X
Farmington	X										X		X			X		X
Glastonbury	X							X				X	X	X		X	X	X
Granby	X				X	X	X	X	X		X		X	X		X	X	
Hartford			X						X	X		X	X			X		X
Hebron	X				X	X		X			X	X	X	X				X
Manchester	X	X				X	X				X					X		
Marlborough	X						X	X	X	X	X		X					X
Newington		X				X		X	X				X			X		
Rocky Hill						X	X	X		X			X	X	X	X		X
Simsbury		X				X				X		X	X	X		X		X
Somers	X	X											X	X		X		X
South Windsor	X					X	X	X	X		X	X	X	X			X	X
Stafford	X					X	X	X	X		X		X	X		X	X	
Suffield	X			X							X		X	X				
Tolland	X			X		X		X			X	X	X	X		X		X
Vernon	X	X						X		X	X		X			X		X
West Hartford								X	X				X					X
Wethersfield	X							X	X		X		X	X	X	X	X	X
Windsor	X	X		X			X	X	X		X		X			X	X	X
Windsor Locks	X													X		X		X
Capitol Region	X	X	X	X		X			X		X	X		X				

Planning Process

The Natural Hazards Mitigation Plan Update planning process began in early 2012 when the Federal Emergency Management Agency (FEMA) awarded the Capitol Region Council of Governments (CRCOG) a Pre-Disaster Mitigation Planning Grant to update its 2008 regional natural hazard mitigation plan. This Plan Update was developed in collaboration with the Capitol Region Emergency Planning Commission (CREPC), the Region's 30 municipalities and the Department of Energy and Environmental Protection (CT DEEP). A planning sub-committee provided guidance to the project. In July 2012, the planning committee met to reexamine the list of hazards impacting the Capitol Region. The committee agreed that the list of eight natural hazards identified in the 2008 Plan should continue to be considered the natural hazards addressed in the Plan Update. The committee rated the hazards for their significance and impact on the Region. Flooding ranked as the number one hazard of concern, followed closely by hurricanes and then by winter storms and tornados. The planning committee met again in February 2013 to reassess the regional mitigation strategies and in September 2013 to review the draft plan document.

CRCOG staff researched natural hazards and major storm events impacting the Region and State in the last several years. The data analyzed came from a variety of sources including FEMA, DEEP, the National Weather Service, regional newspapers, the United States Geological Survey, United States Census Bureau, municipalities and CRCOG's internal geographic information system as well as other resources. The data were used to evaluate natural disasters in terms of frequency, magnitude, areas of impact and economic loss. The collected data was analyzed using the CRCOG's geographic information system and HAZUS-MH, software developed for FEMA to estimate losses from earthquake, hurricanes and floods.

CRCOG staff led efforts to involve officials from each town in updating individual municipal sections. Meetings were held in each of the thirty municipalities and included local staff from a variety of departments including administration, planning, emergency management, police, fire, public health, sanitation, public works, engineering, information technologies, social services, human resources, boards of education, ambulance services, among others. In some towns citizens and elected officials also participated. Following these municipal meetings, CRCOG staff worked with the municipally designated staff contacts to incorporate the updates prepared by the municipalities. In all, over 400 local officials were involved in updating the municipal sections.

A variety of means were used to inform the public of the planning process and to gain public input on hazards, areas and issues of concern, and on mitigation measures. These specific outreach efforts included reports and presentations to local officials; web page updates; an opinion survey developed to solicit input from the public on local mitigation activities and strategies; a series of subregional public meetings. Specific efforts were also made to involve neighboring communities and other regional bodies including Connecticut Light and Power (CL&P) and the Metropolitan District (MDC) into the planning process.

From the survey and subregional meetings, we found there is strong support: 1) for using an emergency alert system to contact residents; 2) for measures which could help restore a sense of normalcy after a significant event, such as providing back-up power to important community facilities and ensuring that roads are quickly passable after storms; 3) for ensuring that the public is prepared for natural disasters through various means of outreach; 4) for training of municipal staff and volunteers for emergency response; for trimming or removing trees to reduce the potential for power outages; and 5) for ensuring the needs of vulnerable populations are addressed.

The public review and comment on the draft Plan Update extended from mid September through October 2013. Notifications of the availability of the plan are posted on CRCOG's website and all municipalities were asked to post similar notices on their websites. Two public meetings were held, one in Hartford and one in Enfield, to gather public comment. Comment was also solicited through the CRCOG website and emails to an extensive list of stakeholders developed during the plan update process. Following the public review, the draft Plan Update was revised to incorporate suggestions received and submitted the Connecticut Department of Energy and Environmental Protection (DEEP) for formal review. State officials reviewed the Plan Update and forwarded it to FEMA for federal review and approval. FEMA requested a number of revisions; these were addressed and the revised Plan Update was resubmitted for State and federal review. FEMA issued its Approval Pending Adoption August 29, 2014.

Plan Implementation and Maintenance

Upon approval of the Plan Update by FEMA, each municipality's governing body as well as CRCOG's Policy Board will need to formally adopt the Plan Update. CREPC will also be asked to append this plan to the Regional Emergency Support Plan (RESP) Plan.

Implementation of the strategies contained within this plan will depend largely on the availability of resources. Each municipality and CRCOG will have to consider the costs, availability of funding, and impacts of each strategy individually. The CRCOG Policy Development & Planning Department will be responsible for regional strategies and coordination with CRCOG Public Safety staff. The planning sub-committee of CREPC (ESF-5), which provided guidance to this project, will monitor progress on its implementation with assistance from CRCOG staff. The sub-committee will conduct annual outreach to municipalities to ascertain progress on proposed mitigation actions.

For more information on natural hazard mitigation planning, please visit CRCOG's website – http://www.crcog.org/community_dev/current_p_fema.html

Table of Contents

ACKNOWLEDGEMENTS....3
ACRONYMS AND ABBREVIATIONS....5
EXECUTIVE SUMMARY....7
Introduction....7
Hazards Impacting the Capitol Region....8
Mitigation Strategy....13
Planning Process....18
Plan Implementation and Maintenance....19
TABLE OF CONTENTS....21
TABLES....24
MAPS....25
FIGURES....26

SECTION I: INTRODUCTION AND OVERVIEW OF THE REGION....27

INTRODUCTION....29
Plan....29
Authority....29
Purpose....30
CONNECTICUT'S CAPITOL REGION....30
Geography and Climate....30
Population and Housing....31
Land Use....33
Cultural and Natural Assets of the Region....34

SECTION II: HAZARD EVALUATION....41

HAZARDS IMPACTING THE CAPITOL REGION....43
Hurricanes and Tropical Storms....49
Floods....55
Dam Failure....71
Severe Winter Storms....74
Tornadoes/High Winds....80
Earthquakes....86
Drought....91
Forest and Wildland Fires....95
HAZARDS SUMMARY....96

SECTION III: MITIGATION STRATEGIES....103

NATURAL HAZARD MITIGATION IN THE CAPITOL REGION....105
Our Capabilities for Implementing Mitigation Actions....105
Existing Strategies....107
Resources....117
Challenges....126
Regional Goals, Objectives and Strategic Actions....128
Municipal Goals, Objectives and Strategic Actions....141
Analysis of Mitigation Actions and Processes....186

SECTION IV: MUNICIPAL PLANS....191

ANDOVER....193
Challenges....193
Goals, Objectives and Strategies....194

AVON 201
Challenges *201*
Goals, Objectives and Strategies *202*
BLOOMFIELD 210
Challenges *210*
Goals, Objectives and Strategies *212*
BOLTON 218
Challenges *218*
Goals, Objectives and Strategies *219*
CANTON 225
Challenges *225*
Goals, Objectives and Strategies *226*
EAST GRANBY 232
Challenges *232*
Goals, Objectives and Strategies *233*
EAST HARTFORD 240
Challenges *240*
Goals, Objectives and Strategies *242*
EAST WINDSOR 249
Challenges *249*
Goals, Objectives and Strategies *251*
ELLINGTON 261
Challenges *261*
Goals, Objectives and Strategies *262*
ENFIELD 267
Existing Strategies *267*
Challenges *267*
Goals, Objectives and Strategies *269*
FARMINGTON 277
Challenges *277*
Goals, Objectives and Strategies *279*
GLASTONBURY 285
Challenges *285*
Goals, Objectives and Strategies *286*
GRANBY 294
Challenges *295*
Goals, Objectives and Strategies *297*
HARTFORD 306
Challenges *306*
Goals, Objectives and Strategies *308*
HEBRON 316
Challenges *316*
Goals, Objectives and Strategies *318*
MANCHESTER 325
Challenges *325*
Goals, Objectives and Strategies *327*
MARLBOROUGH 332
Challenges *332*
Goals, Objectives and Strategies *333*
NEWINGTON 339
Challenges *339*
Goals, Objectives and Strategies *341*

ROCKY HILL 346
Challenges *346*
Goals, Objectives and Strategies *349*
SIMSBURY 356
Challenges *356*
Goals, Objectives and Strategies *358*
SOMERS 366
Challenges *366*
Goals, Objectives and Strategies *368*
SOUTH WINDSOR 374
Challenges *374*
Goals, Objectives and Strategies *375*
STAFFORD 384
Challenges *385*
Goals, Objectives and Strategies *387*
SUFFIELD 393
Challenges *393*
Goals, Objectives and Strategies *394*
TOLLAND 400
Challenges *400*
Goals, Objectives and Strategies *401*
VERNON 410
Challenges *410*
Goals, Objectives and Strategies *411*
WEST HARTFORD 419
Existing Strategies *419*
Challenges *420*
Goals, Objectives and Strategies *421*
WETHERSFIELD 427
Challenges *427*
Goals, Objectives and Strategies *428*
WINDSOR 436
Challenges *436*
Goals, Objectives and Strategies *438*
WINDSOR LOCKS 445
Challenges *445*
Goals, Objectives and Strategies *446*

SECTION V: PLANNING PROCESS 453

PLANNING PROCESS 455
Hazards Identification *455*
Data Collection and Analysis/Risk Assessment *455*
Municipal Plans Review/Update *456*
Strategy Analysis and Prioritization *459*
Public Participation *460*
Coordination with Neighboring Communities and Other Agencies *467*

SECTION VI: PLAN IMPLEMENTATION AND MAINTENANCE 471

BRINGING THE PLAN TO LIFE 473
PLAN ADOPTION 474
STRATEGY IMPLEMENTATION 474
IMPLEMENTATION MONITORING 475

PLAN UPDATES 478

SECTION VII: REFERENCES 479

REFERENCES 481
MUNICIPAL WEBSITES 483
REGIONAL PLANNING AGENCY WEBSITES 484

SECTION VIII: APPENDICES 485

APPENDIX A: PLANNING PROCESS AND PUBLIC PARTICIPATION A5

PLANNING COMMITTEE MEETINGS A5
MEETINGS WITH MUNICIPAL OFFICIALS A20
CRCOG WEBSITE POSTINGS A29
SURVEY RESULTS A38
SUBREGIONAL PUBLIC MEETINGS A64
DRAFT PLAN PUBLIC REVIEW AND COMMENT A133

APPENDIX B: HAZUS-MH EVENT REPORTS B1

REGIONAL EVENT REPORTS B1
MUNICIPAL EVENT REPORTS B52

APPENDIX C: ADOPTION RESOLUTIONS C1

(Please note: the Appendices are formatted to be able to be printed as a separate document.)

Tables

TABLE 1: CAPITOL REGION 2010 POPULATION AND DENSITY 31
TABLE 2: CAPITOL REGION HOUSING UNITS, 1990-2010 32
TABLE 3: 2010 GRAND LIST DATA BY TOWN 33
TABLE 4: COSTS INCURRED BY MUNICIPALITIES AND LOCAL AGENCIES DUE TO 2011 DISASTERS 44
TABLE 5: LOSS ESTIMATES BY HAZARD FOR STATE FACILITIES AND INFRASTRUCTURE 47
TABLE 6: CONNECTICUT FEDERALLY DECLARED DISASTERS SINCE 1954 48
TABLE 7: HAZUS-MH LOSS ESTIMATES BY MUNICIPALITIES FOR A CATEGORY 3 HURRICANE 51
TABLE 8: DAMAGE ESTIMATES TO CAPITOL REGION MUNICIPALITIES FROM THE AUGUST 1955 FLOOD 56
TABLE 9: ESTIMATED LOSSES TO CAPITOL REGION COMMUNITIES FROM 100 YEAR FLOOD EVENTS 61
TABLE 10: PERCENTAGE OF LAND USES (BY ZONING DISTRICT CATEGORIES) IN FEMA FLOOD ZONES 63
TABLE 11: NATIONAL FLOOD INSURANCE PROGRAM LOSS STATISTICS S OF FEBRUARY 29, 2012 67
TABLE 12: NATIONAL FLOOD INSURANCE PROGRAM REPETITIVE LOSS CLAIMS 1982-2011 69
TABLE 13: DAM HAZARD CATEGORIES 71
TABLE 14: CAPITOL REGION HIGH HAZARD DAMS (CLASS C) 72
TABLE 15: CAPITOL REGION DAMS IMPACTED BY OCTOBER 2005 FLOODING 74
TABLE 16: TORNADOES IN HARTFORD AND TOLLAND COUNTIES 1950-1995 85
TABLE 17: SUMMARY OF LOCAL VULNERABILITIES TO NATURAL HAZARDS AND KEY ISSUES 99
TABLE 18: CAPITOL REGION MEMBER COMMUNITIES MUNICIPAL GOVERNMENTAL STRUCTURES 106
TABLE 19: COMMUNITY PARTICIPATION IN NATIONAL FLOOD PROGRAM 108
TABLE 20: MUNICIPAL FLOOD PLAIN REGULATIONS 109
TABLE 21: MUNICIPAL LAND USE AGENCIES AND PLANS 112
TABLE 22: SUMMARY OF TYPES OF MITIGATION PROJECTS PROPOSED BY COMMUNITY 143

Table 23: Listing of Municipal Strategic Actions from 2008 Plan & 2014-2019 Plan Update 144
Table 24: Benefit Cost Ratio Scoring Definitions 186
Table 25: Benefit Cost Ratios for Municipal Mitigation Actions 188
Table 26: Benefit Cost Ratios for Regional Mitigation Actions 189
Table 27: Muncipal Representatives Involved in Plan Update Process 457
Table 28: Mitigation measures by frequency of Selection 461
Table 29: Natural Hazards Mitigation Plan Update Primary Municipal Contacts 475

Maps

Map 1: Capitol Region Topography 36
Map 2: Capitol Region Land Cover - 2006 37
Map 3: Capitol Region Plan of Conservation and Development Land Use Policy Map 38
Map 4: Locations of Endangered and Threatened Species in the Capitol Region 39
Map 5: National Register of Historic Sites and Districts in Capitol Region 40
Map 6: Capitol Region Population Density, Floodplains, And High & Significant Hazard Dams 66
Map 7: Total Flood Insurance Loss Claims & Payments for the Capitol Region Feb. 2012 68
Map 8: Capitol Region Insurance Claims for Repetitive Flood Losses 70
Map 9: Dams in Capitol Region 72
Map 10: Andover Population Density, Dams and Flood Zones 199
Map 11: Andover Flood Plain, Repetitive Loss Areas, Dams and Important Facilities 200
Map 12 Avon Population Density, Dams and Flood Zones 209
Map 13: Avon Flood Plain, Repetitive Loss Areas, Dams and Important Facilities 210
Map 14: Bloomfield Population Density, Dams and Flood Zones 216
Map 15: Bloomfield Flood Plain, Repetitive Loss Areas, Dams and Important Facilities 217
Map 16: Bolton Population Density, Dams and Flood Zones 223
Map 17: Bolton Flood Plains, Repetitive Loss Areas, Dams and Important Facilities 224
Map 18: Canton Population Density, Dams and Flood Zones 230
Map 19: Canton Flood Plains, Repetitive Loss Areas, Dams and Important Facilities 231
Map 20: East Granby Population Density, Dams and Flood Zones 238
Map 21: East Granby Flood Plains, Repetitive Loss Areas, Dams and Important Facilities 239
Map 22 East Hartford Population Density, Dams and Flood Zones 247
Map 23: East Hartford Flood Plains, Repetitive Loss Areas, Dams and Important Facilities 248
Map 24: East Windsor Population Density, Dams and Flood Zones 259
Map 25: East Windsor Flood Plains, Repetitive Loss Areas, Dams and Important Facilities 260
Map 26: Ellington Population Density, Dams and Flood Zones 265
Map 27: Ellington Flood Plains, Repetitive Loss Areas, Dams and Important Facilities 266
Map 28: Enfield Population Density, Dams and Flood Zones 275
Map 29: Enfield Flood Plains, Repetitive Loss Areas, Dams and Important Facilities 276
Map 30: Farmington Population Density, Dams and Flood Zones 283
Map 31: Farmington Flood Plains, Repetitive Loss Areas, Dams and Important Facilities 284
Map 32: Glastonbury Population Density, Dams and Flood Zones 292
Map 33: Glastonbury Flood Plains, Repetitive Loss Areas, Dams and Important Facilities 293
Map 34: Granby Population Density, Dams and Flood Zones 304
Map 35: Granby Flood Plains, Repetitive Loss Areas, Dams and Important Facilities 305
Map 36: Hartford Population Density, Dams and Flood Zones 314
Map 37: Hartford Flood Plains, Repetitive Loss Areas, Dams and Important Facilities 315
Map 38: Hebron Population Density, Dams and Flood Zones 323
Map 39: Hebron Flood Plains, Repetitive Loss Areas, Dams and Important Facilities 324
Map 40: Manchester Population Density, Dams and Flood Zones 330

Map 41: Manchester Flood Plains, Repetitive Loss Areas, Dams and Important Facilities 331
Map 42: Marlborough Population Density, Dams and Flood Zones 337
Map 43: Marlborough Flood Plains, Repetitive Loss Areas, Dams and Important Facilities 338
Map 44: Newington Population Density, Dams and Flood Zones 344
Map 45: Newington Flood Plains, Repetitive Loss Areas, Dams and Important Facilities 345
Map 46: Rocky Hill Population Density, Dams and Flood Zones 354
Map 47: Rocky Hill Flood Plains, Repetitive Loss Areas, Dams and Important Facilities 355
Map 48: Simsbury Population Density, Dams and Flood Zones 364
Map 49: Simsbury Flood Plains, Repetitive Loss Areas, Dams and Important Facilities 365
Map 50: Somers Population Density, Dams and Flood Zones 372
Map 51: Somers Flood Plains, Repetitive Loss Areas, Dams and Important Facilities 373
Map 52: South Windsor Population Density, Dams and Flood Zones 382
Map 53: South Windsor Flood Plains, Repetitive Loss Areas, Dams, Important Facilities 383
Map 54: Stafford Population Density, Dams and Flood Zones 391
Map 55: Stafford Flood Plains, Repetitive Loss Areas, Dams and Important Facilities 392
Map 56: Suffield Population Density, Dams and Flood Zones 398
Map 57: Suffield Flood Plains, Repetitive Loss Areas, Dams and Important Facilities 399
Map 58: Tolland Population Density, Dams and Flood Zones 408
Map 59: Tolland Flood Plains, Repetitive Loss Areas, Dams and Important Facilities 409
Map 60: Vernon Population Density, Dams and Flood Zones 417
Map 61: Vernon Flood Plains, Repetitive Loss Areas, Dams and Important Facilities 418
Map 62: West Hartford Population Density, Dams and Flood Zones 425
Map 63: West Hartford Flood Plains, Repetitive Loss Areas, Dams,Important Facilities 426
Map 64: Wethersfield Population Density, Dams and Flood Zones 434
Map 65: Wethersfield Flood Plains, Repetitive Loss Areas, Dams and Important Facilities 435
Map 66: Windsor Population Density, Dams and Flood Zones 443
Map 67: Windsor Flood Plains, Repetitive Loss Areas, Dams and Important Facilities 444
Map 68: Windsor Locks Population Density, Dams and Flood Zones 450
Map 69: Windsor Locks Repetitive Flood Loss Claims, Dams, Flood Zones, Open Space 451
Map 70: CRCOG and CREPC Municipalities 468

Figures

Figure 1:Storm Tracks of Category 3 or Higher Hurricanes Across Connecticut 50
Figure 2: Hazus-MH Levels of Analysis and User Sophistication 60
Figure 3: Capitol Region Zoning in FEMA Flood Zones 62
Figure 4: October 2011 Snowfall Totals Across Central Connecticut 79
Figure 5: Blizzard of 2013 Snowfall Totals 80
Figure 6: Tornado Tracks Across Connecticut 86
Figure 7: Earthquake Probabilities in New England 87
Figure 8: magnitude 5.0 Earthquake Probability Map 88
FIGURE 9: Connecticut Drought Matrix 92
Figure 10: Leveed Areas in East Hartford and Hartford 115
Figure 11: Core Steps in the Mitigation Planning Process 473

Section I: Introduction and Overview of the Region

Introduction

The Capitol Region Council of Governments (CRCOG) received Federal Emergency Management Agency (FEMA) funds through the Connecticut Department of Energy and Environmental Protection (DEEP) to develop a Natural Hazard Mitigation Plan Update for the thirty municipalities comprising the region:

City of Hartford	Town of Enfield	Town of Somers
Town of Andover	Town of Farmington	Town of South Windsor
Town of Avon	Town of Glastonbury	Town of Stafford
Town of Bloomfield	Town of Granby	Town of Suffield
Town of Bolton	Town of Hebron	Town of Tolland
Town of Canton	Town of Manchester	Town of Vernon
Town of East Granby	Town of Marlborough	Town of West Hartford
Town of East Hartford	Town of Newington	Town of Wethersfield
Town of East Windsor	Town of Rocky Hill	Town of Windsor
Town of Ellington	Town of Simsbury	Town of Windsor Locks

CRCOG staff and municipal officials from each community contributed to this planning project.

Plan

This plan update builds on the existing Pre-Disaster Natural Hazard Mitigation Plan of 2008. (All of the communities listed above except Stafford, which joined the Capitol Region in 2010, participated in the 2008 Plan.) This introductory section contains a brief overview of the plan's purpose and an introduction to the region and its current conditions. It describes who we are and what we have at stake. Section II profiles and evaluates the natural hazards that affect the Capitol Region. Section III assesses regional and local capabilities, summarizes the local and regional mitigation actions, and describes the regional mitigation goals and strategies in more detail. Section IV describes each participating community, their vulnerabilities to natural hazards and their mitigation strategies. Section V describes the planning process undertaken by CRCOG and its member municipalities to complete this plan. Section VI outlines the process for implementing, monitoring and updating the plan as well as summarizing the adoption process. Section VII documents the sources we used. Finally, the appendices provide further details on our planning process and loss estimations.

Authority

The Federal Disaster Mitigation Act of 2000 (DMA 2000) amended Section 322, "Mitigation Planning" and other sections of the Robert T. Stafford Disaster Relief and Emergency Assistance Act to promote natural hazard mitigation planning. DMA 2000 requires local governments to have an approved Natural Hazard Mitigation Plan to be eligible to receive Hazard Mitigation Grant Program project funding. Once approved by FEMA and adopted locally, this regional plan will fulfill that requirement.

Purpose

The purpose of this plan is to identify natural hazards likely to affect the Capitol Region, assess our vulnerabilities to these hazards and set forth mitigation strategies that will reduce the loss of life and property, economic disruptions and the cost of post-disaster recovery for the region's communities. Unlike other emergency plans already adopted for the region, this Natural Hazard Mitigation Plan focuses on reducing or eliminating the impacts of natural hazards. Nevertheless, as mitigation measures are only a part of emergency preparedness, this plan will be incorporated into the Regional Emergency Support Plan (RESP) after adoption. The Capitol Region's communities recognize their responsibility to protect the health, safety and welfare of their citizens and will strive to implement the mitigation strategies they propose. However, while this plan provides a blueprint for local and regional efforts to reduce or eliminate risk to life and property from natural hazards, it does not constitute a mandate, specification or regulation.

The plan considers the following natural hazards that affect the region:

- Dam failure
- Drought
- Earthquake
- Flooding
- Forest and Wild Land Fires
- Hurricanes and Tropical Storms
- Tornados and High Winds
- Severe Winter Storms

Mitigation goals and strategies were developed at both the regional and local levels. CRCOG and the Capitol Region Emergency Planning Committee (CREPC), in addition to local and other partners, are responsible for implementation of the regional goals contained in this plan. Each participating municipality identified its own mitigation goals and strategies and assumes responsibility for implementation of those measures.

Connecticut's Capitol Region

Geography and Climate

The Connecticut River valley bisects the Capitol Region from north to south. The western and eastern edges of the region contain more steep slopes, and narrower tributary river valleys than the relatively flat, central valley (see the topography map at the end of this section). The region's climate, like the State's, is dominated by relatively even distribution of precipitation across four seasons; a significant range in temperatures both seasonally and daily; and, significant variability in weather over brief time spans as well as across years. Generally, the region has a moderate climate with maximum temperatures ranging from 35-40° in winter to 80-85° in summer. The average minimum temperature ranges from about 31° in winter to 70° in summer. Average annual precipitation is about 45 inches, although this can vary widely. About 40 inches of snow can be expected per year, with wide variation across the hills and valleys of the region and again, with wide variation from year to year. For example, in Stafford in the region's northeast, snowfall amounts average just less than 40 inches in the southern area of the town but increase to nearly 60 inches in the northwest corner.

Population and Housing

Connecticut's Capitol Region encompasses the City of Hartford, Connecticut's capital, and the 29 surrounding suburban and rural communities. It is a region rich in history as well as human and natural resources. Portions of the Farmington and Connecticut Rivers traverse the region, in addition to several smaller river complexes, including the Hockanum, Park and Scantic. The region contains urbanized and heavily developed areas as well as low density suburbs and rural enclaves.

The total regional population according to the 2010 U.S. Census is 769,598. As Table 1 indicates, population density across the region varies dramatically, from a low of 208 people per square mile in Stafford to a high of 7,212 people per square mile in Hartford. The 2010 Census counts of the population represent a 3.8% increase in the region's population since 2000. In that same time, the region experienced an overall growth in its number of housing units of about 4.3%; however, the region's rural and suburban towns account for the bulk of this increase in housing units. Between 2000 and 2010, the number of single family housing units in rural portions of the region increased by about 12%; while in suburban areas the increase was about 7%; and in urbanized areas of the region (Hartford and the towns of East Hartford, Enfield, Manchester, Newington, Rocky Hill, Vernon, West Hartford, Wethersfield and Windsor Locks) the increase was about 1%. Over this same time period, multifamily housing units grew by nearly 12% in rural areas; 2% in suburban areas; and 8% in urbanized communities.

Overall, the region contained an estimated 315,237 housing units in 2010. The majority of these units are single family detached housing units as seen in Table 2 (It should be noted that the Capitol Region also grew since the preparation of the 2008 Pre-Disaster Natural Hazards Mitigation Plan because Stafford joined the Capitol Region.)

Table 1: Capitol Region 2010 Population and Density

Municipality	2010 Census Population	Land Area (sq. mi.)	Density (per sq. mi.)	Municipality	2010 Census Population	Land Area (sq. mi.)	Density (per sq. mi.)
Andover	3,303	16	213	Manchester	58,241	27	2,133
Avon	18,098	23	783	Marlborough	6,404	23	275
Bloomfield	20,486	26	788	Newington	30,562	13	2,315
Bolton	4,980	14	346	Rocky Hill	19,709	14	1,460
Canton	10,292	25	418	Simsbury	23,511	34	694
East Granby	5,148	18	294	Somers	11,444	28	404
East Hartford	51,252	18	2,847	South Windsor	25,709	28	918
East Windsor	11,162	26	424	Stafford	12,087	58	208
Ellington	15,602	34	458	Suffield	15,735	42	373
Enfield	44,654	33	1,337	Tolland	15,052	40	379
Farmington	25,340	28	902	Vernon	29,179	18	1,649
Glastonbury	34,427	51	670	West Hartford	63,268	22	2,876
Granby	11,282	41	277	Wethersfield	26,668	12	2,151
Hartford	124,775	17	7,212	Windsor	29,044	30	981
Hebron	9,686	37	262	Windsor Locks	12,498	9	1,389
				Capitol Region	**769,598**	**805**	**956**

Source: U.S. Census Bureau; 2010 Census Redistricting Data (Public Law 94-171) Summary File and Connecticut Register and Manual, 2011.

Table 2: Capitol Region Housing Units - 1990 – 2010

Municipality	Total Housing Units (1)				Units in Structure - 2010 (2)				
	1990	2000	2010	2000 - 2010 Change	% Single Family (SF) Detached	1-unit (SF) detached	1-unit, attached	2 - 4 Units	5 or More Units
Andover	1,054	1,173	1,286	9.6%	95%	1,227	15	11	33
Avon	5,639	6,612	7,260	9.8%	71%	4,999	842	487	728
Bloomfield	7,853	8,175	8,985	9.9%	67%	6,135	556	668	1,719
Bolton	1,668	1,905	2,073	8.8%	86%	1,937	57	184	76
Canton	3,338	3,612	4,213	16.6%	73%	3,023	208	421	480
East Granby	1,679	1,931	2,121	9.8%	78%	1,590	56	144	253
East Hartford	21,335	21,355	21,370	0.1%	51%	11,012	936	4,195	4,887
East Windsor	4,290	4,410	5,070	15.0%	54%	2,553	353	361	1,207
Ellington	4,571	5,328	6,340	19.0%	62%	3,890	201	679	1,501
Enfield	16,520	17,106	17,319	1.3%	70%	11,950	969	2,190	1,864
Farmington	8,885	9,852	10,633	7.9%	65%	7,111	1,298	1,024	1,484
Glastonbury	11,098	12,632	13,390	6.0%	76%	10,208	1,051	973	1,189
Granby	3,555	3,991	4,253	6.6%	88%	3,841	182	159	159
Hartford	57,433	54,353	51,469	-5.3%	15%	8,164	1,608	20,115	24,803
Hebron	2,528	3,091	3,422	10.7%	91%	3,127	79	140	95
Manchester	22,322	23,249	25,647	10.3%	49%	12,379	1,726	4,670	6,679
Marlborough	1,850	2,182	2,308	5.8%	89%	1,976	109	103	33
Newington	11,782	12,350	12,764	3.4%	65%	8,141	1,616	1,000	1,816
Rocky Hill	7,044	7,927	8,537	7.7%	46%	3,945	979	724	2,870
Simsbury	8,267	8,808	9,069	3.0%	81%	7,027	412	529	733
Somers	2,818	3,075	3,314	7.8%	95%	3,301	18	113	23
South Windsor	8,185	9,083	9,900	9.0%	74%	7,245	1,051	240	1,146
Stafford	4,509	4,679	4,965	6.1%	75%	3,830	168	622	470
Suffield	4,399	5,006	5,393	7.7%	81%	4,339	405	408	213
Tolland	3,854	4,789	5,279	10.2%	91%	4,814	113	194	154
Vernon	12,629	12,984	14,269	9.9%	48%	6,459	452	2,484	3,803
West Hartford	24,948	25,361	26,026	2.6%	66%	16,872	831	3,040	4,919
Wethersfield	11,243	11,256	11,577	2.9%	74%	8,431	485	991	1,455
Windsor	10,709	10,846	11,565	6.6%	76%	8,666	874	1,095	766
Windsor Locks	4,982	5,091	5,420	6.5%	71%	3,851	351	461	752
Capitol Region	**290,987**	**302,212**	**315,237**	**4.3%**	**58%**	**182,043**	**18,001**	**48,425**	**66,310**

Sources: (1) U.S. Census, CT DECD - *Annual Housing Inventory by Town: 1990-2010* from http://www.ct.gov/ecd/cwp/view.asp?a=1106&q=250640, and (2) U.S. Census, American Community Survey, *2006-2010 5-Year Estimates, Selected Housing Characteristics*, http://factfinder2.census.gov/.

Land Use

Like most inland areas in New England, the Capitol Region historically developed along its major rivers. That early settlement pattern is still evident in contemporary land uses, with more urbanized areas concentrated along the Connecticut, Farmington, and Hockanum Rivers. Less dense development, and more significant forested and open space lands exist on the western and eastern edges of the region. Map 2 on page 37 displays land cover across the region in 2006. As is evident from the map, more development has occurred in a rather diffuse pattern, away from the traditional urban core. This map was derived from the Center for Land Use Education and Research (CLEAR) at the University of Connecticut. Town-level land cover change maps for the same time period are available on CLEAR's website. These maps can help towns assess the vulnerability of new developments to natural hazard risks. The Capitol Region's current Plan of Conservation and Development's Land Use Policy Map is displayed on page 38 (Map 3). The Land Use Policy Map represents the generalized land use plan for the region and its thirty municipalities. It reflects existing and proposed regional priority areas of development and preservation and shows municipal focus areas for development and conservation.

From the State Capitol and state office buildings in Hartford to the multitude of state-owned facilities in Enfield, Suffield, Rocky Hill, Wethersfield and Newington; from the repurposed Rentschler Field in East Hartford to Bradley International Airport in Windsor Locks and the rapidly emerging commercial/industrial Day Hill Road area in Windsor; from to the major retail developments in West Hartford to those in Manchester and South Windsor, the Capitol Region hosts significant commercial, industrial and public properties. According to 2010 equalized net grand list data, the region contains $64.4 billion in taxable real, personal and motor vehicle property. (See Table 3 below.) Not all properties are equally vulnerable to all natural hazards as location and building materials influence vulnerability; nevertheless, the region risks substantial financial losses from catastrophic natural hazards affecting not only property, but also business and government operations.

Table 3: 2010 Grand List Data by Town

MUNICIPALITY	EQUALIZED NET GRAND LIST 10/1/10	GRAND LIST COMPONENTS				
		Residential	Commercial/ Industrial/ Public Utility	Motor Vehicle	Personal	Other
Andover	$279,528,100	84.1%	2.8%	8.5%	2.1%	2.4%
Avon	$2,660,104,290	78.5%	11.7%	6.1%	3.4%	0.2%
Bloomfield	$2,050,319,265	53.5%	26.6%	6.9%	12.8%	0.2%
Bolton	$481,767,830	80.6%	5.2%	7.8%	2.4%	3.9%
Canton	$1,123,215,696	76.5%	12.9%	6.8%	3.5%	0.2%
East Granby	$599,134,920	61.7%	15.5%	8.3%	11.4%	3.1%
East Hartford	$3,349,318,242	56.0%	22.8%	7.4%	12.9%	0.8%
East Windsor	$1,103,050,514	55.6%	26.8%	8.1%	7.5%	2.0%
Ellington	$1,264,066,286	74.6%	11.6%	8.8%	4.2%	0.7%
Enfield	$3,247,614,530	65.1%	21.0%	7.5%	5.6%	0.8%
Farmington	$3,773,377,563	65.3%	22.9%	5.4%	6.1%	0.2%
Glastonbury	$4,186,777,080	76.6%	13.8%	6.3%	3.3%	0.0%

MUNICIPALITY	EQUALIZED NET GRAND LIST 10/1/10	GRAND LIST COMPONENTS				
		Residential	Commercial/ Industrial/ Public Utility	Motor Vehicle	Personal	Other
Granby	$1,061,469,580	77.1%	4.7%	7.7%	1.8%	8.7%
Hartford	$3,791,364,553	21.3%	50.8%	7.3%	18.3%	2.4%
Hebron	$871,545,420	86.1%	3.2%	7.8%	1.6%	1.3%
Manchester	$4,392,920,742	56.1%	29.3%	7.1%	7.5%	0.0%
Marlborough	$629,115,848	85.9%	5.0%	7.5%	1.4%	0.2%
Newington	$2,742,989,011	64.4%	20.6%	7.5%	6.7%	0.8%
Rocky Hill	$2,175,642,805	60.0%	27.2%	7.0%	5.5%	0.3%
Simsbury	$2,612,598,506	76.3%	12.4%	6.6%	4.0%	0.8%
Somers	$834,268,209	80.5%	4.7%	8.5%	3.2%	3.1%
South Windsor	$2,854,210,130	65.9%	18.2%	6.8%	8.1%	1.0%
Stafford	$843,111,400	68.8%	8.2%	9.3%	8.4%	5.3%
Suffield	$1,413,185,714	80.3%	7.6%	7.2%	4.0%	0.8%
Tolland	$1,299,161,599	81.2%	6.8%	8.9%	2.6%	0.5%
Vernon	$1,931,920,463	65.8%	20.8%	8.5%	4.4%	0.5%
West Hartford	$6,262,015,365	75.4%	14.6%	6.2%	3.2%	0.7%
Wethersfield	$2,330,234,510	77.7%	12.4%	7.1%	2.8%	0.0%
Windsor	$3,218,691,290	50.6%	27.4%	5.8%	15.5%	0.7%
Windsor Locks	$1,374,810,906	46.3%	23.6%	13.0%	17.1%	0.0%

Source: *Municipal Fiscal Indicators: Fiscal Years Ended 2007 - 2011.* CT Office of Policy and Management
Downloaded from http://www.ct.gov/opm/lib/opm/igp/munfinsr/FI_2007-2011_1-15-13.pdf.

Cultural and Natural Assets of the Region

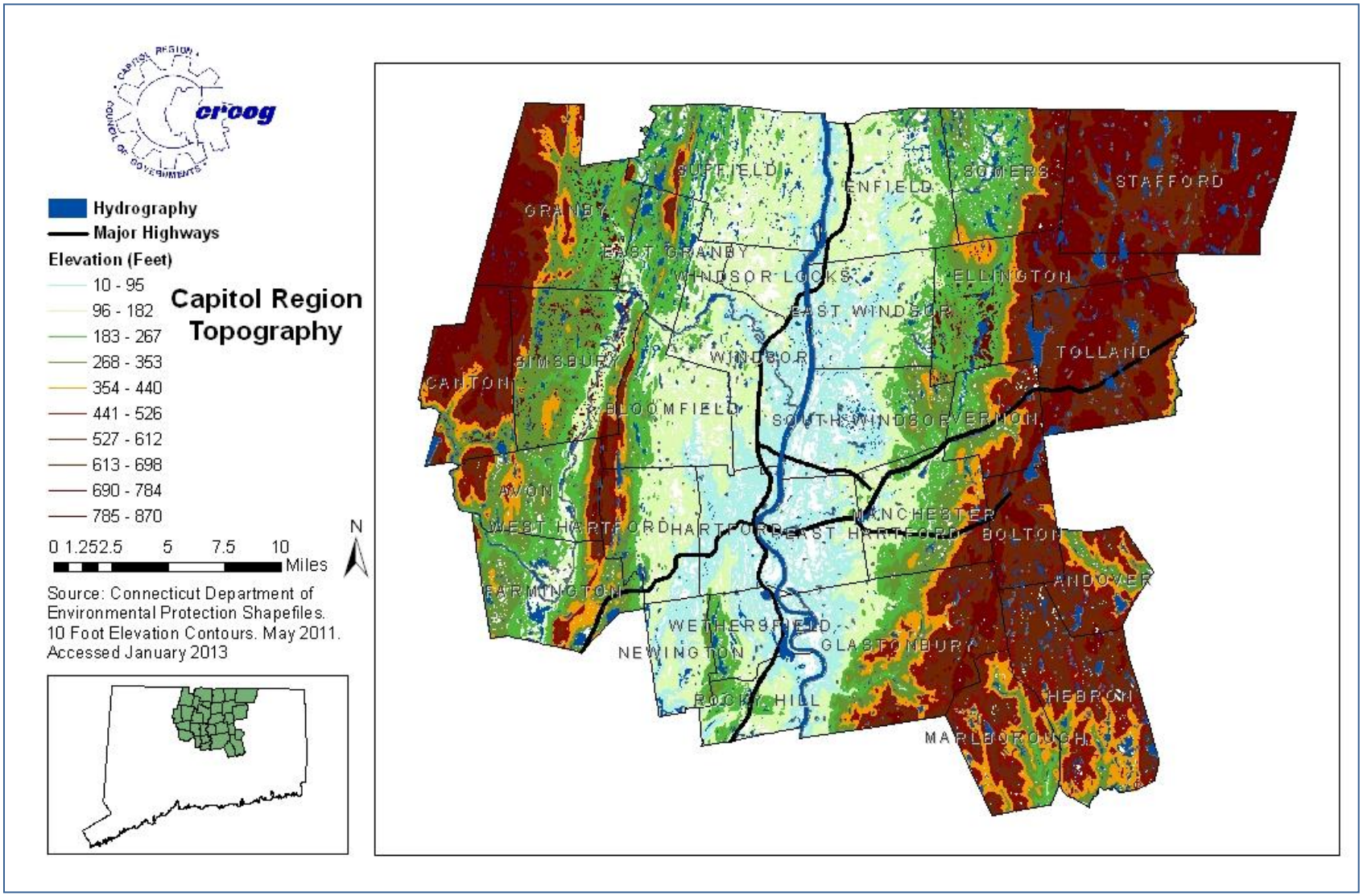
The Capitol Region is rich in natural, historic and cultural assets. Efforts have been taken by many to recognize, preserve and protect these assets. These assets should be considered in our mitigation planning whether in efforts to further protect the assets from the impacts of natural disasters or to minimize potential adverse impacts that may affect these assets.

The Connecticut Department of Energy and Environmental Protection (DEEP) maintains a database of plant and animal species which are endangered, threatened or of special concern. The list is lengthy and can be seen on DEEP's website at http://www.ct.gov/dep/cwp/view.asp?a=2702&q=323474&depNav_GID=1628. In the Capitol Region, some of the species listed include the Barn Owl, Red-headed Woodpecker, Timber Rattlesnake, Wood Turtle, Short-nose Sturgeon, Ground Beetle, Sedge, Yellow Lady's-slipper, Red Pine and Prickly Pear. Map 4 displays the approximate locations endangered, threatened and special concern species and significant natural communities in the Capitol Region. These locations are taken from DEEP's Natural Diversity Data Base (NDDB) Maps. These maps are intended to be a pre-screening tool to identify potential impacts to state-listed species. The DEEP should be consulted regarding any mitigation projects that may be considered in these areas.

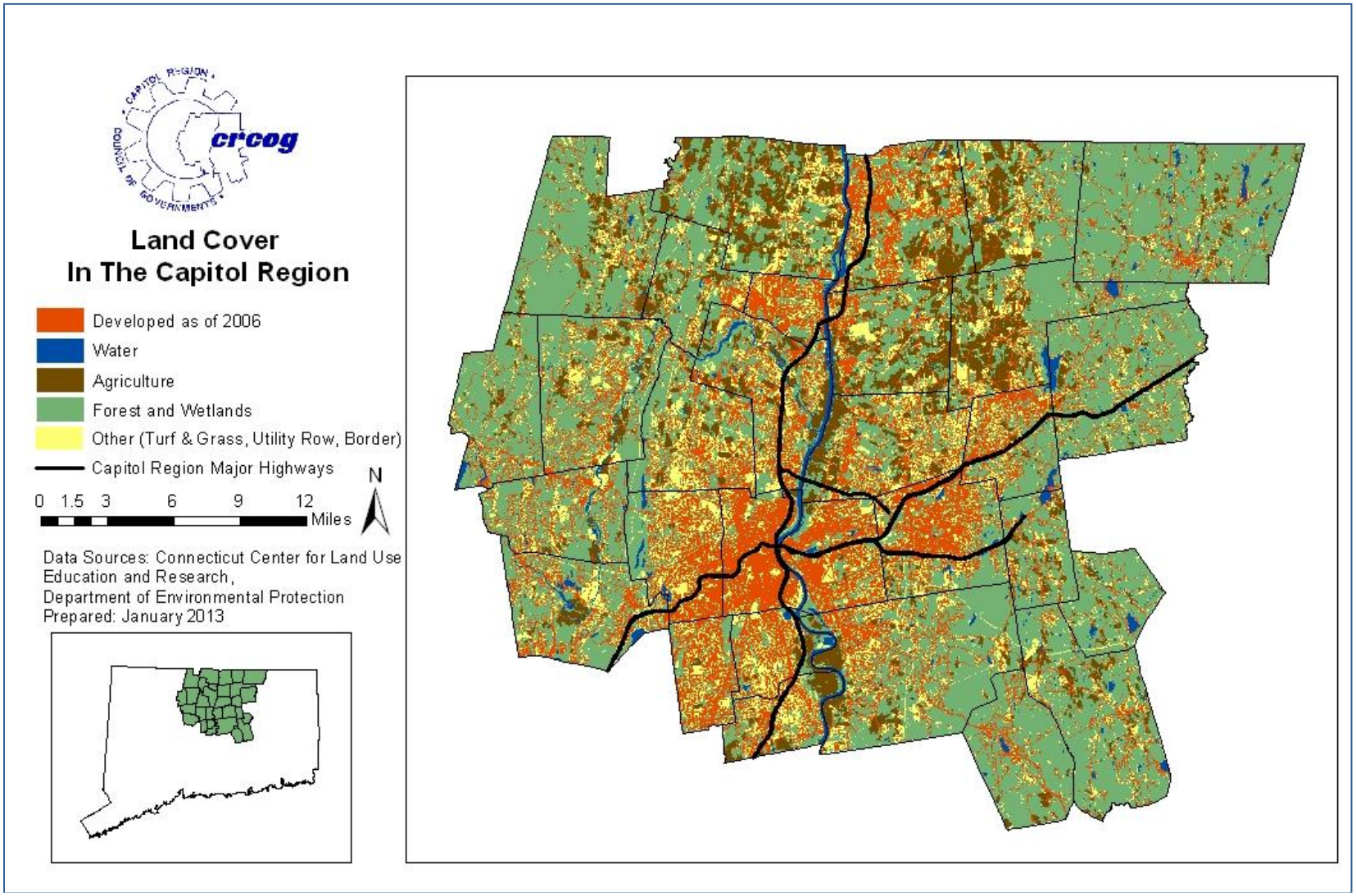
The numerous structures, sites and districts listed on the State and National Registers of Historic Places in the Capitol Region attest to the importance of historic preservation to our communities. Sites on the Registers are significant to our culture. (Map 5 displays sites on the National Register.) The State Historic Preservation Office (SHPO) should be consulted regarding any mitigation projects that may be considered which could affect buildings or sites on the Registers. SHPO also maintains a list of State Archeological Preserves. The Archaeological Preserves in the Capitol Region are:

- Dividend Brook Industrial Archaeological District, Rocky Hill
- Small Pox Hospital Rock, Farmington
- Newgate Prison and Copper Mine, East Granby
- Fifth Camp of Rochambeau's Infantry, Bolton

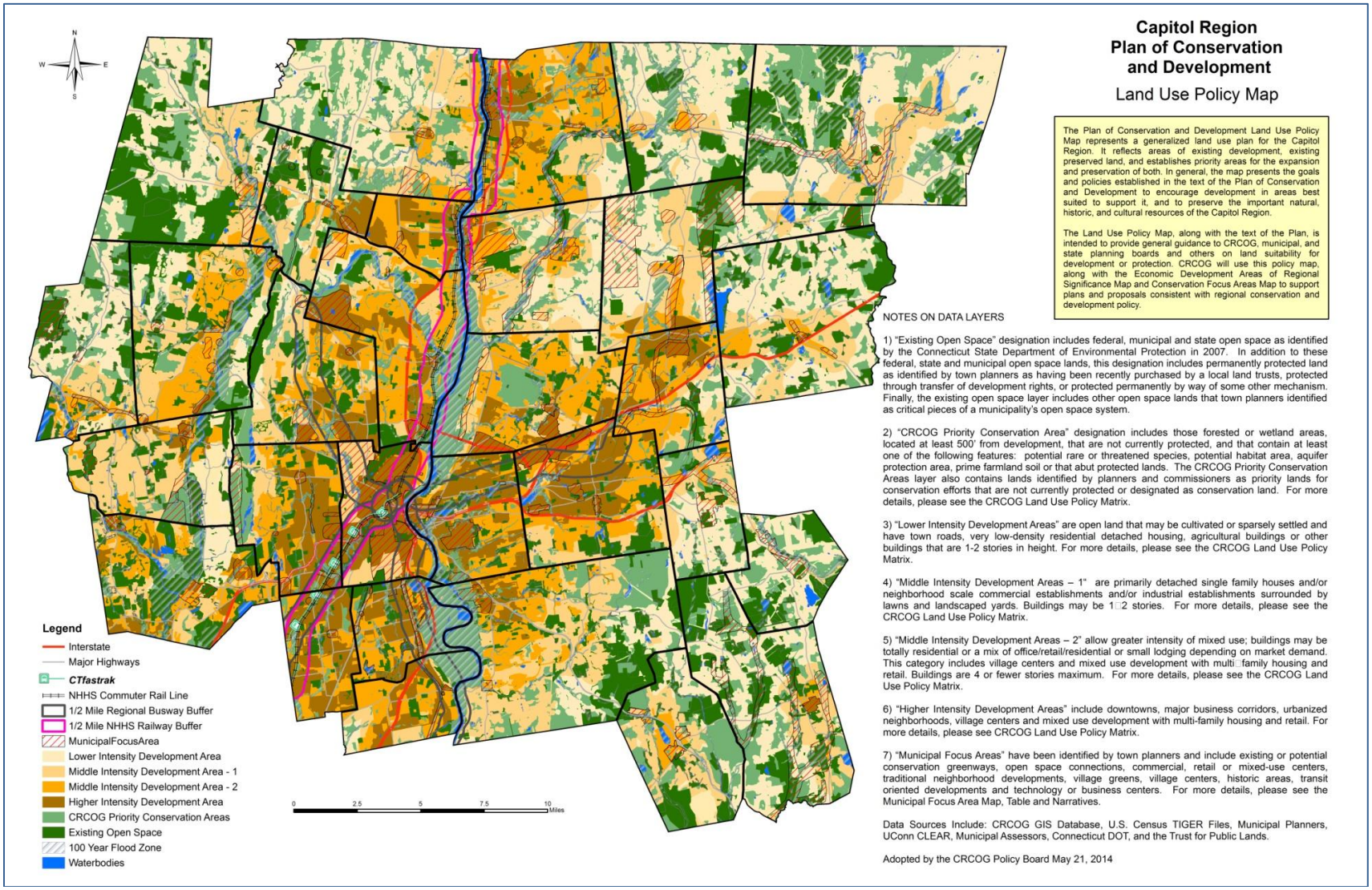
Map 1: Capitol Region Topography



Map 2: Capitol Region Land Cover -2006



Map 3: Capitol Region Plan of Conservation and Development Land Use Policy Map



Capitol Region Plan of Conservation and Development

Land Use Policy Map

The Plan of Conservation and Development Land Use Policy Map represents a generalized land use plan for the Capitol Region. It reflects areas of existing development, existing preserved land, and establishes priority areas for the expansion and preservation of both. In general, the map presents the goals and policies established in the text of the Plan of Conservation and Development to encourage development in areas best suited to support it, and to preserve the important natural, historic, and cultural resources of the Capitol Region.

The Land Use Policy Map, along with the text of the Plan, is intended to provide general guidance to CRCOG, municipal, and state planning boards and others on land suitability for development or protection. CRCOG will use this policy map, along with the Economic Development Areas of Regional Significance Map and Conservation Focus Areas Map to support plans and proposals consistent with regional conservation and development policy.

NOTES ON DATA LAYERS

1) "Existing Open Space" designation includes federal, municipal and state open space as identified by the Connecticut State Department of Environmental Protection in 2007. In addition to these federal, state and municipal open space lands, this designation includes permanently protected land as identified by town planners as having been recently purchased by a local land trusts, protected through transfer of development rights, or protected permanently by way of some other mechanism. Finally, the existing open space layer includes other open space lands that town planners identified as critical pieces of a municipality's open space system.

2) "CRCOG Priority Conservation Area" designation includes those forested or wetland areas, located at least 500' from development, that are not currently protected, and that contain at least one of the following features: potential rare or threatened species, potential habitat area, aquifer protection area, prime farmland soil or that abut protected lands. The CRCOG Priority Conservation Areas layer also contains lands identified by planners and commissioners as priority lands for conservation efforts that are not currently protected or designated as conservation land. For more details, please see the CRCOG Land Use Policy Matrix.

3) "Lower Intensity Development Areas" are open land that may be cultivated or sparsely settled and have town roads, very low-density residential detached housing, agricultural buildings or other buildings that are 1-2 stories in height. For more details, please see the CRCOG Land Use Policy Matrix.

4) "Middle Intensity Development Areas – 1" are primarily detached single family houses and/or neighborhood scale commercial establishments and/or industrial establishments surrounded by lawns and landscaped yards. Buildings may be 1□2 stories. For more details, please see the CRCOG Land Use Policy Matrix.

5) "Middle Intensity Development Areas – 2" allow greater intensity of mixed use; buildings may be totally residential or a mix of office/retail/residential or small lodging depending on market demand. This category includes village centers and mixed use development with multi□family housing and retail. Buildings are 4 or fewer stories maximum. For more details, please see the CRCOG Land Use Policy Matrix.

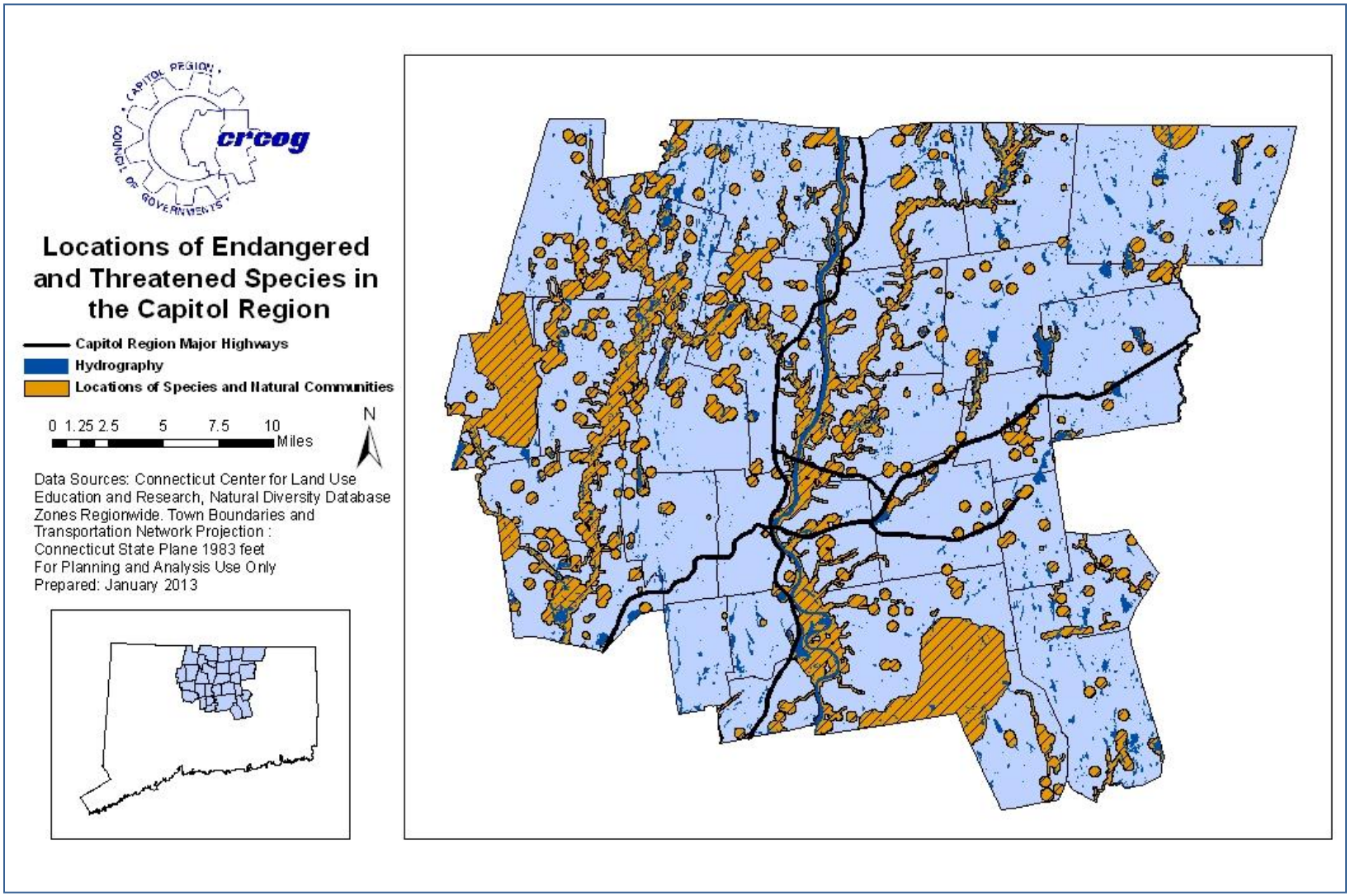
6) "Higher Intensity Development Areas" include downtowns, major business corridors, urbanized neighborhoods, village centers and mixed use development with multi-family housing and retail. For more details, please see CRCOG Land Use Policy Matrix.

7) "Municipal Focus Areas" have been identified by town planners and include existing or potential conservation greenways, open space connections, commercial, retail or mixed-use centers, traditional neighborhood developments, village greens, village centers, historic areas, transit oriented developments and technology or business centers. For more details, please see the Municipal Focus Area Map, Table and Narratives.

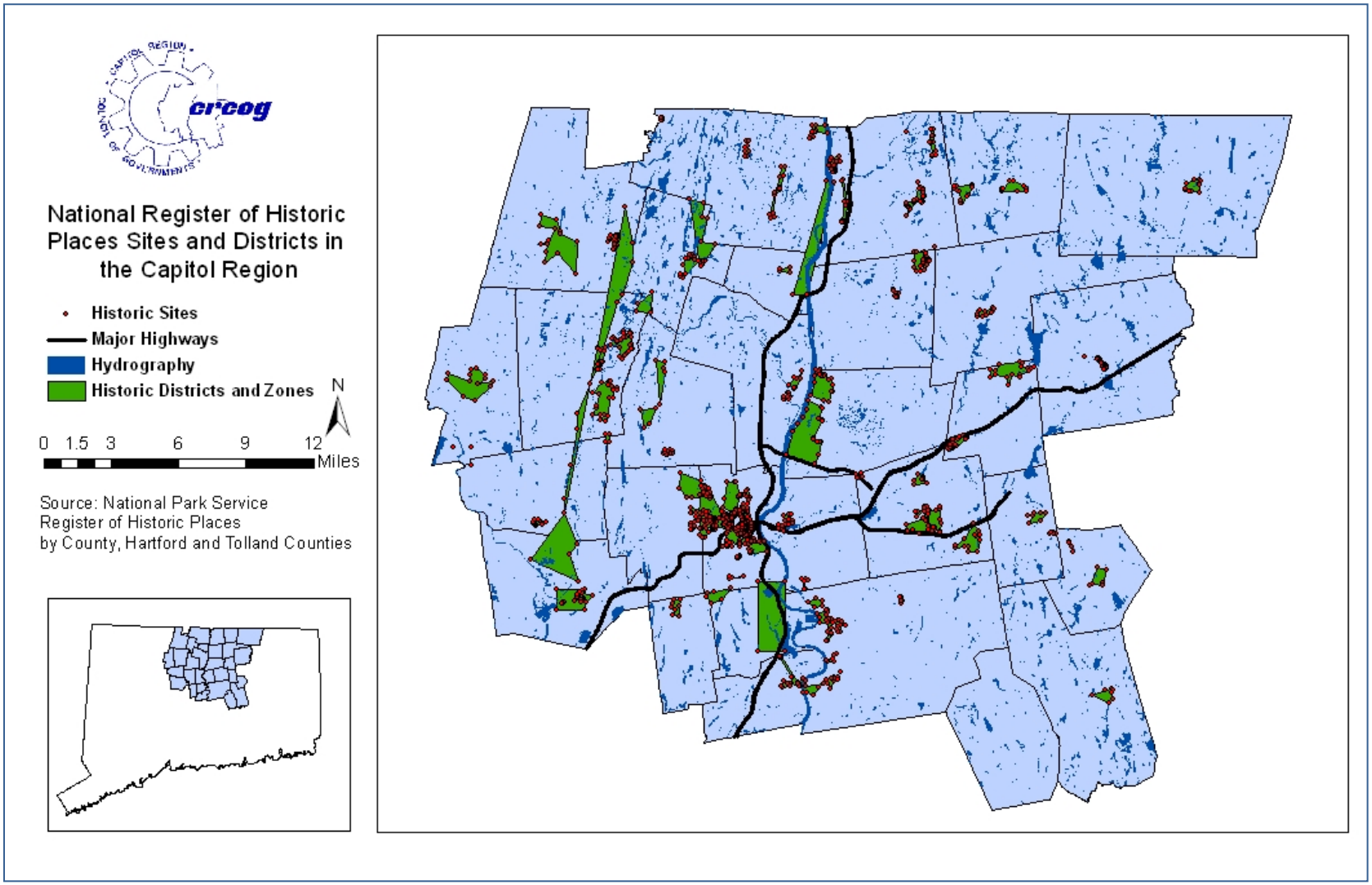
Data Sources Include: CRCOG GIS Database, U.S. Census TIGER Files, Municipal Planners, UConn CLEAR, Municipal Assessors, Connecticut DOT, and the Trust for Public Lands.

Adopted by the CRCOG Policy Board May 21, 2014

Map 4: Locations of Endangered and Threatened Species in the Capitol Region



Map 5: National Register of Historic Sites and Districts in the Capitol Region



Section II: Hazard Evaluation

Hazards Impacting the Capitol Region

The Capitol Region is vulnerable to the numerous natural hazards described in this section. While flooding, winter storms and high wind events are the natural hazards that most frequently occur with enough severity to cause loss of life or property, this plan covers all of the natural hazards that have the potential to cause damage anywhere in the region. The hazards we evaluated are:

- Dam failure
- Drought
- Earthquake
- Flooding
- Forest and Wild Land Fires
- Hurricanes and Tropical Storms
- Tornados and High Winds
- Severe Winter Storms

These eight natural hazards are those which were identified by the planning committee as of most concern for the region and its communities. Other natural hazards which can impact the region include ice jams, heat waves and solar flares. While not specifically evaluated in this plan, the impacts of such hazards can be mitigated by some of the measures identified to deal with the eight natural hazards evaluated in this plan update. Climate change is also expected to impact our temperature, precipitation and wind patterns and could cause a change in the frequency or intensity of natural hazards such as floods, droughts, winter storms and damaging rain storms.

Climate change is also projected to result in an acceleration of observed rates of Relative Sea Level Rise (RSLR). *Connecticut's Natural Hazard Mitigation Plan Update, 2014*, identifies Sea Level Rise as a natural hazard affecting the State. The State Plan evaluated the impact of rises in sea level ranging from 0.5 to 5.0 feet relative to mean sea level. The State analysis determined that a number of State-owned facilities and other critical facilities such as fire stations, EMS and law enforcement structures, and storage tank farms in Fairfield, New Haven and New London counties could be exposed to the risks associated with Sea Level Rise. The State analysis did not cite any expected impacts on State or other critical facilities in Hartford or Tolland counties which are the inland counties in which the Capitol Region's communities are located. Although Sea Level Rise associated with climate change is included in the State Plan, because of the inland location of the Capitol Region we did not feel sea level rise would have a direct or significant impact on the region's communities within the timeframe of this plan update.

Understanding the natural hazards we are likely to face is crucial for our ability to prepare for and respond to disasters. Researching historic data on major storms and other natural disasters can be helpful in this analysis. Knowing where and when natural disasters have occurred in the past is important to our understanding of our risks. To assess the risks we face from natural disasters, we can evaluate past occurrences of major disasters, looking at the losses to life and property incurred by our communities, state, residents and businesses. The following pages contain descriptions of major storm events and their impact on the Capitol Region.

Natural disasters can be costly for local communities. Table 4 on the following page outlines the costs incurred by Capitol Region municipalities and other local and private nonprofit agencies in each community from the three federally declared disasters of 2011. The costs incurred due to Storm Alfred in the fall of 2011 were particularly high due to the enormous amounts of debris generated in the aftermath of that storm.

Table 4: Costs Incurred by Municipalities and Local Agencies Due to Federally Declared Disasters in 2011

2011 Disasters Damage Amounts Eligible for 75% Reimbursement Under FEMA Public Assistance Program				
Applicant: Municipality & Other Agencies (Fire Districts, Schools, Private Non-Profits)	100% of Amount Eligible for 75% Reimbursement			Total Damages Eligible for Public Assistance Due to 2011 Disasters
	DR-1958-CT 2011 Snow	DR-4023-CT Irene August 2011	DR-4046-CT Severe Weather Oct 2011 (Alfred)	
Town of Andover	$20,262.29	$21,914.70	$12,205.65	$54,382.64
Andover Other	$3,250.81	$15,757.65	$1,827.33	$20,835.79
Andover Total	$23,513.10	$37,672.35	$14,032.98	$75,218.43
Town of Avon	$60,686.78	$148,578.36	$2,388,663.29	$2,597,928.43
Town of Bloomfield	$88,130.28	$8,275.76	$2,882,712.48	$2,979,118.52
Bloomfield Other			$26,720.34	$26,720.34
Bloomfield Total	$88,130.28	$8,275.76	$2,909,432.82	$3,005,838.86
Town of Bolton	$27,738.45	$20,197.39	$127,070.54	$175,006.38
Town of Canton	$37,329.72	$33,659.34	$386,482.66	$457,471.72
Canton Other	$3,630.46		$25,154.85	$28,785.31
Canton Total	$40,960.18	$33,659.34	$411,637.51	$486,257.03
Town of East Granby	$75,416.27	$12,698.57	$555,322.46	$643,437.30
Town of East Hartford	$273,700.15	$226,257.35	$1,812,341.64	$2,312,299.14
East Hartford Other	$7,194.00	$147,730.66	$94,244.91	$249,169.57
East Hartford Total	$280,894.15	$373,988.01	$1,906,586.55	$2,561,468.71
Town of East Windsor	$36,736.12	$118,773.41	$282,704.32	$438,213.85
East Windsor Other	$1,874.34		$8,855.44	$10,729.78
East Windsor Total	$38,610.46	$118,773.41	$291,559.76	$448,943.63
Town of Ellington	$77,625.51	$44,076.23	$620,025.07	$741,726.81
Ellington Other			$16,231.20	$16,231.20
Ellington Total	$77,625.51	$44,076.23	$636,256.27	$757,958.01
Town of Enfield	$99,370.97	$66,936.15	$5,602,310.18	$5,768,617.30
Enfield Other	$19,583.89		$214,754.25	$234,338.14
Enfield Total	$118,954.86	$66,936.15	$5,817,064.43	$6,002,955.44
Town of Farmington	$73,307.82	$144,255.66	$2,371,538.19	$2,589,101.67
Farmington Other	$9,508.58		$58,644.34	$68,152.92
Farmington Total	$82,816.40	$144,255.66	$2,430,182.53	$2,657,254.59
Town of Glastonbury	$151,750.38	$143,264.05	$2,912,150.36	$3,207,164.79
Glastonbury Other	$4,192.05		$61,468.77	$65,660.82
Glastonbury Total	$155,942.43	$143,264.05	$2,973,619.13	$3,272,825.61
Town of Granby	$39,537.37	$84,643.21	$1,925,977.58	$2,050,158.16
City of Hartford	$212,570.62	$176,984.14	$3,895,708.62	$4,285,263.38
Hartford Other	$230,581.69	$261,043.73	$876,819.30	$1,368,444.72
Hartford Total	$443,152.31	$438,027.87	$4,772,527.92	$5,653,708.10
Town of Hebron	$47,786.22	$61,537.03	$35,050.27	$144,373.52
Hebron Other	$12,081.81	$6,741.62		$18,823.43
Hebron Total	$59,868.03	$68,278.65	$35,050.27	$163,196.95
Town of Manchester	$195,625.42	$98,051.65	$5,490,873.84	$5,784,550.91
Manchester Other	$16,605.57		$120,205.26	$136,810.83
Manchester Total	$212,230.99	$98,051.65	$5,611,079.10	$5,921,361.74
Town of Marlborough	$50,074.99	$31,387.47	$78,128.83	$159,591.29
Town of Newington	$65,803.73	$140,941.77	$1,975,847.48	$2,182,592.98
Town of Rocky Hill	$113,168.33	$257,069.39	$690,662.55	$1,060,900.27
Town of Simsbury	$75,635.26	$60,224.55	$3,557,624.88	$3,693,484.69
Simsbury Other			$107,978.10	$107,978.10
Simsbury Total	$75,635.26	$60,224.55	$3,665,602.98	$3,801,462.79
Town of Somers	$52,949.48	$35,555.20	$1,218,810.02	$1,307,314.70
Town of South Windsor	$99,058.79	$153,119.56	$6,860,182.25	$7,112,360.60
South Windsor Other			$1,604.08	$1,604.08
South Windsor Total	$99,058.79	$153,119.56	$6,861,786.33	$7,113,964.68
Town of Stafford	$58,390.40	$24,715.39	$115,652.35	$198,758.14
Stafford Other	$18,923.27	$4,713.82		$23,637.09
Stafford Total	$77,313.67	$29,429.21	$115,652.35	$222,395.23
Town of Suffield	$48,872.01	$26,647.77	$1,411,547.33	$1,487,067.11
Town of Tolland	$93,126.72	$138,848.56	$811,818.36	$1,043,793.64
Tolland Other			$29,789.98	$29,789.98
Tolland Total	$93,126.72	$138,848.56	$841,608.34	$1,073,583.62
Town of Vernon	$106,773.87	$142,079.05	$3,805,918.87	$4,054,771.79
Vernon Other	$5,819.71			$5,819.71
Vernon Total	$112,593.58	$142,079.05	$3,805,918.87	$4,060,591.50
Town of West Hartford	$224,752.76	$111,036.05	$10,423,313.83	$10,759,102.64
West Hartford Other	$11,074.33	$1,630.43	$86,759.95	$99,464.71
West Hartford Total	$235,827.09	$112,666.48	$10,510,073.78	$10,858,567.35
Town of Wethersfield	$114,269.56	$152,522.68	$1,243,730.14	$1,510,522.38
Wethersfield Other	$4,222.19	$2,120.45	$121,939.41	$128,282.05
Wethersfield Total	$118,491.75	$154,643.13	$1,365,669.55	$1,638,804.43
Town of Windsor	$113,320.96	$38,998.75	$1,070,737.94	$1,223,057.65
Windsor Other	$12,961.60		$14,219.63	$27,181.23
Windsor Total	$126,282.56	$38,998.75	$1,084,957.57	$1,250,238.88
Town of Windsor Locks	$58,133.89	$21,047.07	$1,583,630.87	$1,662,811.83
Total Capitol Region	**$3,153,409.42**	**$3,184,034.62**	**$68,015,959.99**	**$74,353,404.03**

Notes: Amounts shown represent the costs associated with damages incurred by the municipalities and local public and private nonprofit agencies due to the three federally declared disasters of 2011. Up to 75% of these costs are reimbursable under FEMA's Public Assistance Program. **Source:** CT DEMHS, April 2013.

In assessing our risks from natural hazards, we need to consider what and who will be affected. Identifying where essential community facilities such as hospitals, police and fire stations, emergency operations centers, and schools are located and determining if they are likely to be damaged is necessary for our understanding of our risks. Similarly, knowing where other facilities which are important to our communities, as well as where vulnerable populations are located is important to our ability to protect them from harm. This plan includes maps for each municipality which show the important community facilities, dams and floodplains.

While knowing where existing vulnerabilities are, it is also important to limit new or increased vulnerabilities. The communities of the Capitol Region have development controls, such as flood plain and inland wetlands regulations and building codes, in place to regulate or restrict the construction of new structures which could increase their level of vulnerability to the natural hazards. Local communities have strictly limited the amount of new development in hazard prone areas and have required any new development to conform to flood plain requirements in accordance with the NFIP and to inland wetlands regulations in accordance with State requirements. Since the adoption of the 2008 Plan, most communities have not permitted any structures in the special flood hazard areas. Those that have allowed structures in these areas have required they be built above the base flood elevation and that compensatory storage be provided as needed. Furthermore, many of the local flood plain and wetland permits issued were for projects which improved stormwater drainage and helped mitigate flooding. Details of any local development since 2008 in hazard prone areas are provided for each community in Section IV: Municipal Plans.

Determining our potential losses from disasters is a daunting task. Reliable and comprehensive estimates of the losses each community faces from the various natural hazards are generally not available. The costs incurred by local communities as a result of the federal disasters of 2011 shown in Table 4 provide a partial indication of potential losses but these costs do not cover all the costs associated with natural disasters including those experienced by private businesses and citizens. The equalized net grand list (Table 3) provides an estimate of the market value of all taxable property in each community and can give an indication of the total value of property exposed to natural disasters of a town wide or region wide scope. The State recently updated Connecticut's Natural Hazard Mitigation Plan. In the development of the 2014 Update, the State estimated the losses that State facilities and infrastructure as well as certain other critical facilities would sustain from each of the natural hazards evaluated. These hazard specific loss estimates are based on the number of infrastructure/facilities and building and contents values exposed to the hazards. These hazard specific loss estimates are presented in Table 5 for each of the Capitol Region municipalities. As discussed in the State Plan, the data sets used in the estimation analysis are still under development and the loss estimates should not be used for other applications. As with the 2011 federal disaster-related losses, these estimates provide a partial indication of potential losses.

Computer modeling is another means of analyzing risks we face from natural disasters. CRCOG used FEMA's Hazus-MH model to evaluate our risks and estimate the losses we might face to life and property. We used Hazus-MH to analyze the risks that the region and each municipality might face from flooding, earthquakes and hurricanes. Hazus-MH is a software program which can be used throughout the United States and provides standard loss estimations and damage assessments based on historical hazard events, Census data and other federal and nationally-based databases. The Hazus-MH model uses 2000 Census data and block boundaries as a baseline for analyzing losses. Because of the limitations of the dated Census and inventory data used in the Hazus-MH analyses, the loss estimates should at best be considered approximate.

About HAZUS

HAZUS®MH is the Federal Emergency Management Agency's (FEMA) nationally applicable software program that estimates potential building and infrastructure losses from earthquakes, riverine and coastal floods, and hurricane winds. HAZUS-MH loss estimates reflect state-of-the-art scientific and engineering knowledge and can be used to inform decision-making at all levels of government by providing a reasonable basis for developing mitigation, emergency preparedness, and response and recovery plans and policies.

HAZUS-MH uses geographic information system software (ArcGIS) to map and display hazard data, the results of damage and economic loss analyses, and potential effects on area populations. HAZUS-MH analyses also can be run in real time to support response and recovery actions following a disaster event.

Flood Risk Assessments: The HAZUS-MH Flood Model is capable of assessing riverine and coastal flooding. It estimates potential damage and loss to buildings, essential facilities, bridges, vehicles, and agricultural crops. It also addresses the amount of building debris that will be generated as well as shelter requirements. The Flood Information Tool (FIT) helps users to prepare local flood hazard and other pertinent data for use in the HAZUS-MH Flood Model.

Earthquake Risk Assessments: The HAZUS-MH Earthquake Model estimates earthquake damage and loss to buildings, essential facilities, and transportation and utility lifelines. It also addresses debris generation, fire-following earthquake, casualties, and shelter requirements. The Advanced Engineering Building Module (AEBM) permits the analysis of individual buildings to measure the effects of various mitigation actions.

Hurricane Wind Risk Assessments: The HAZUS-MH Hurricane Model allows users in the Atlantic and Gulf Coast regions of the continental United States and Hawaii to estimate potential damage and loss to buildings and essential facilities from hurricane winds. It also allows users to estimate post-storm shelter needs, and building and tree debris quantities.

Source: National Institute of Building Sciences

Table 5: Loss Estimates by Hazard for State Facilities and Infrastructure

Municipality	Thunderstorm Losses	Hurricane Losses	Tornado Losses	Winter Weather Losses	Flood Losses	Sea Level Rise Losses	Erosion Losses	Dam Inundation Losses	Wildland Urban Interface Losses	Earthquake Losses
Andover	$379,686	$710,062	$60,268	$12,656					$379,686	$14,062
Avon	$30,754,567	$5,896,879	$8,787,019	$1,025,152			$6,834,348		$30,754,567	$455,623
Bloomfield	$37,968,601	$10,887,620	$10,848,172	$1,265,620			$7,593,720		$11,390,580	$562,498
Bolton	$2,939,769	$631,166	$466,630	$97,992					$2,939,769	$108,880
Canton	$379,686	$4,102,581	$108,482	$12,656						$5,625
East Granby	$2,873,843,382	$581,964,714	$821,098,109	$95,794,779			$132,130,73		$132,130,730	$42,575,458
East Hartford	$18,604,614	$19,092,782	$5,315,604	$620,154						$275,624
East Windsor	$200,853,897	$48,442,017	$57,386,828	$6,695,130					$139,724,450	$2,975,613
Ellington	$92,268	$4,733,748	$14,646	$3,076						$3,417
Enfield	$1,366,869,623	$265,982,577	$390,534,178	$45,562,321	$45,562,321		$45,562,321		$45,562,321	$20,249,920
Farmington	$838,726,388	$162,572,669	$239,636,111	$27,957,546	$107,071,454		$107,071,45		$499,666,784	$12,425,576
Glastonbury	$85,429,351	$20,197,323	$24,408,386	$2,847,645					$17,085,870	$1,265,620
Granby	$379,686	$867,854	$108,482	$12,656					$379,686	$5,625
Hartford	$5,197,521,742	$1,048,525,09	$1,485,006,21	$173,250,725	$44,423,263					$77,000,322
Hebron	$37,968,601	$8,710,085	$6,026,762	$1,265,620			$7,593,720			$1,406,244
Manchester	$151,874,403	$38,061,840	$43,392,686	$5,062,480				$112,500	$7,593,720	$2,249,991
Newington	$1,233,599,835	$245,444,814	$352,457,096	$41,119,994			$21,642,102			$18,275,553
Rocky Hill	$2,135,733,786	$437,713,863	$610,209,653	$71,191,126			$28,476,450		$56,952,901	$31,640,501
Simsbury	$37,968,601	$30,927,151	$10,848,172	$1,265,620	$11,390,580			$168,749	$26,578,020	$562,498
Somers	$319,315,931	$88,126,601	$50,685,068	$10,643,864			$22,021,788		$55,054,471	$11,826,516
South Windsor	$379,686	$10,729,828	$108,482	$12,656						$5,625
Stafford	$37,968,601	$9,940,870	$6,026,762	$1,265,620					$7,593,720	$1,406,244
Suffield	$413,478,061	$78,422,419	$118,136,589	$13,782,602					$213,003,850	$6,125,601
Tolland	$13,668,696	$6,785,038	$2,169,634	$455,623			$9,112,464		$13,668,696	$506,248
Vernon	$20,820,707	$8,394,451	$3,304,874	$694,024	$4,556,232				$11,313,342	$771,137
West Hartford	$13,668,696	$3,944,790	$3,905,342	$455,623						$202,499
Wethersfield	$151,874,403	$34,871,941	$43,392,686	$5,062,480						$2,249,991
Windsor	$85,429,351	$40,868,021	$24,408,386	$2,847,645						$1,265,620
Windsor Locks	$9,240,038,652	$1,917,483,36	$2,640,011,04	$308,001,288	$118,462,034					$136,889,46
Capitol Region	**$24,548,531,27**	**$5,135,032,16**	**$6,958,862,36**	**$818,284,373**	**$331,465,884**	**$0**	**$388,039,09**	**$281,249**	**$1,271,773,163**	**$373,307,59**

Note: This table is excerpted from Table 2-77 in *Connecticut's Natural Hazard Mitigation Plan Update, 2014.* These hazard specific loss estimates are based on the number of infrastructure/facilities and building and contents values exposed to the hazards in each community. As discussed in the State Plan, the data sets used in the estimation analysis are still under development and the loss estimates should not be used for other applications.

Some natural disasters, such as stream and river flooding affect specific areas and their damages although significant, may be localized. Other natural disasters such as hurricanes and blizzards can impact the whole region and beyond. Such widespread natural disasters can overwhelm State and local resources and the Governor may seek assistance from the federal government. Table 6 below lists the Federal Emergency and Disaster Declarations declared for Connecticut since 1954:

Table 6: Connecticut Federally Declared Disasters Since 1954

Date	Incident Description	Declaration Type	Declaration Number
3/21/13	Severe Winter Storm and Snowstorm	Major Disaster Declaration	4106
2/8/2013	Severe Winter Storm	Emergency Declaration	3361
10/28/2012	Hurricane Sandy	Emergency Declaration	3353
11/17/2011	Severe Storm	Major Disaster Declaration	4046
10/31/2011	Severe Storm	Emergency Declaration	3342
9/2/2011	Tropical Storm Irene	Major Disaster Declaration	4023
8/27/2011	Hurricane Irene	Emergency Declaration	3331
3/3/2011	Snowstorm	Major Disaster Declaration	1958
4/23/2010	Severe Storms and Flooding	Major Disaster Declaration	1904
5/11/2007	Severe Storms and Flooding	Major Disaster Declaration	1700
5/2/2006	Snow	Emergency Declaration	3266
12/16/2005	Severe Storms and Flooding	Major Disaster Declaration	1619
9/13/2005	Hurricane Katrina Evacuation	Emergency Declaration	3246
2/17/2005	Snow	Emergency Declaration	3200
1/15/2004	Snow	Emergency Declaration	3192
3/11/2003	Snowstorm	Emergency Declaration	3176
9/23/1999	Tropical Storm Floyd	Major Disaster Declaration	1302
1/24/1996	Blizzard	Major Disaster Declaration	1092
3/16/1993	Severe Winds and Blizzard, Record Snowfall	Emergency Declaration	3098
12/17/1992	Coastal Flooding, Winter Storm	Major Disaster Declaration	972
8/30/1991	Hurricane Bob	Major Disaster Declaration	916
7/17/1989	SEVERE STORMS,TORNADOES	Major Disaster Declaration	837
10/11/1985	HURRICANE GLORIA	Major Disaster Declaration	747
6/18/1984	SEVERE STORMS, FLOODING	Major Disaster Declaration	711
6/14/1982	SEVERE STORMS, FLOODING	Major Disaster Declaration	661
10/4/1979	TORNADO, SEVERE STORMS	Major Disaster Declaration	608
2/7/1978	Blizzards and Snowstorms	Emergency Declaration	3060
8/20/1955	Hurricane, Torrential Rain, Floods	Major Disaster Declaration	42
9/17/1954	Hurricane	Major Disaster Declaration	25

Source: www.fema.gov/disasters

Hurricanes and Tropical Storms

The Atlantic hurricane season extends from June 1st through November 30th each year. Hurricanes that hit Connecticut normally form in the tropical waters of the Atlantic, Caribbean, or Gulf of Mexico. This is the time period when environmental conditions are most favorable for a tropical cyclone to develop. The greatest risk of a hurricane impacting New England within this six-month period is from late August to mid-October.

While the Capitol Region is spared the coastal storm surges associated with hurricanes, it is not immune from damaging winds and rain. According to the State's Hazard Mitigation Plan, a moderate Category II hurricane can be expected to hit Connecticut once every twenty-three to thirty years. A major Category III or IV hurricane may occur before 2040, based on 20th century trends. See the accompanying description of the Saffir-Simpson Hurricane Wind Scale on the next page for an explanation of hurricane categories.

Both the 1938 and 1944 hurricanes that hit Connecticut were Category III hurricanes. The 1938 Hurricane is still considered the greatest natural disaster to hit the State, as it killed 125 people and caused an estimated $53 million (1938 dollars) in damage across the state. Hurricane Carol in 1954 also caused widespread damage across the state. Remnants of two hurricanes (Connie and Diane) struck Connecticut in the same week in August 1955 causing massive flooding and 70 deaths throughout the state. A Category II hurricane, Gloria, made land fall in Connecticut in 1985 downing and damaging several thousand trees, and causing widespread power outages, but with little rain or flooding. In 1999, Hurricane Floyd, downgraded to a tropical storm prior to making landfall in Connecticut, resulted in presidential disaster declarations for Fairfield, Hartford and Litchfield Counties. Numerous less intense hurricanes and tropical storms have affected the region and state, some causing significant damage.

More recently, in August 2011, Hurricane Irene, also downgraded to a tropical storm before hitting Connecticut, caused widespread damage to the region and state. Irene was responsible for three deaths associated with flooding and downed wires from falling trees. According to the Hartford Courant, insurance companies paid out $235 million on more than 60,000 claims in Connecticut related to damage from Irene. However, this figure does not include hundreds of millions more in uncovered expenses and clean up costs for Connecticut's largest electric utility, Connecticut Light and Power. At the height of the storm some 754,000 residents were without power. Capitol Region cities and towns were widely affected by downed trees, flooding and power outages as a result of Irene. Many residents and businesses were without power over a week. According to the Connecticut Division of Emergency Management and Homeland Security, municipalities, other local and private nonprofit agencies incurred expenses of over $3.18 million due to Irene. The municipalities and agencies are eligible for reimbursement of 75% of these costs under FEMA's Public Assistance program.

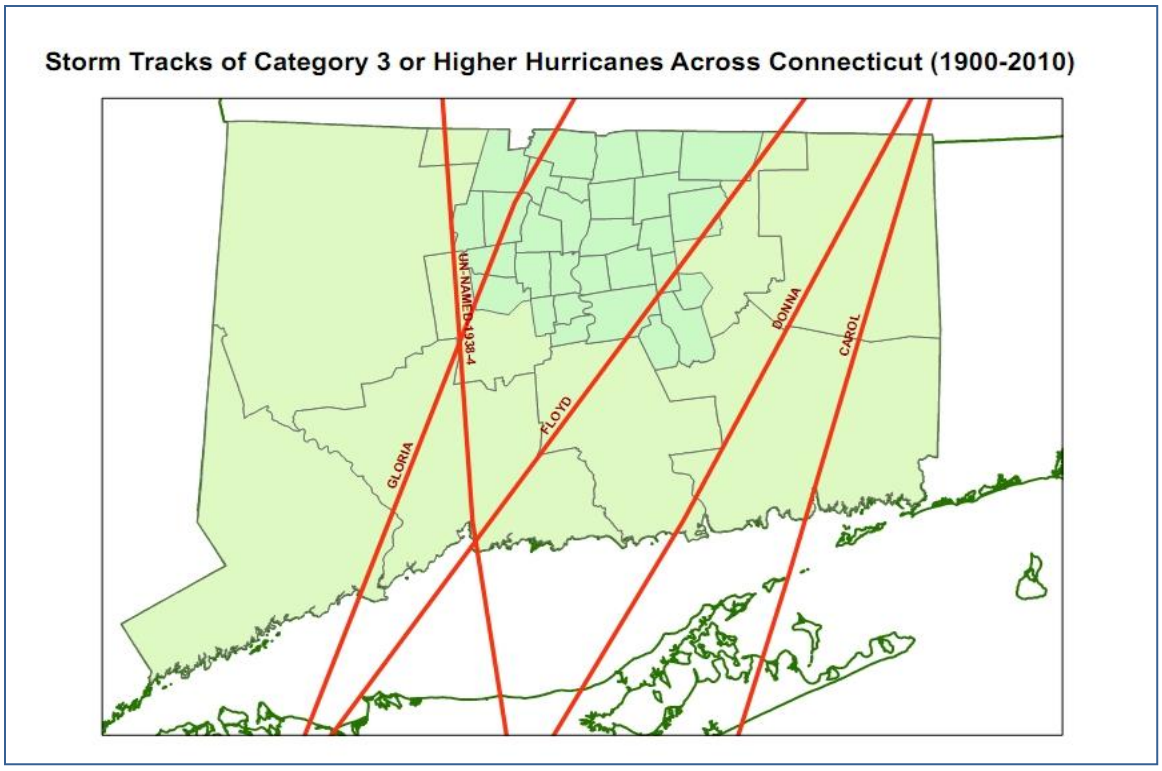
Hurricane Sandy made landfall on October 29, 2012, causing costly and widespread destruction to coastal communities in Connecticut, as well in numerous other states in the Northeast. Damage due to Sandy was also felt far inland; in Connecticut, all but Hartford County was covered by the Disaster Declaration. In the Capitol Region, communities in Tolland County were designated as eligible for public assistance for funding to repair and rebuild disaster-damaged infrastructure as well as costs for debris removal and emergency protective measures.

Flooding in Granby in the Aftermath of Irene. Credit: Ted Glanzer, West Hartford Patch.

Downed Wires in Enfield Caused by Hurricane Irene. Credit: Ted Jensen, West Hartford Patch.

The State Hazard Mitigation Plan states that hurricanes pose the most destructive potential of all natural disasters for Connecticut. They occur relatively frequently, and cause structural damage, loss of life, felled trees, flooding, power outages and other damages. However, hurricanes pose a greater risk for coastal Connecticut because of storm surges and associated flooding risks.

Figure 1: Storm Tracks of Category 3 or Higher Hurricanes across Connecticut



The map above shows the storm tracks across Connecticut of hurricanes that achieved Category 3 or higher ratings at some point as they passed over the United States.

Using FEMA's Hazus-MH software, CRCOG analyzed several hurricane scenarios to estimate the potential loss to property and life for the region as a whole. The Hazus-MH hurricane model primarily considers wind damage for inland areas such as the Capitol Region which are not subject to storm surges. It primarily assesses physical damage and the economic losses associated with those. Economic losses associated with the loss of electricity are not considered except as a factor in determining the number of households displaced and/or likely to use public shelters. We also ran simulations for each municipality to assess the damages we could expect if a hurricane with the strength of the 1938 Hurricane happened today. We would expect this to be a "worst case scenario". Such a storm would be expected to occur less than once in 500 years and would have a maximum peak gust of 116 mph in the Region. (Copies of the regional Hazus-MH Hurricane Event Reports are included in the Appendix.)

According to the "worst case scenario" regional analysis, if a hurricane with the strength of the 1938 Hurricane occurred today, the Capitol Region would suffer a total economic loss of about $3.678 billion**.** HAZUS software estimates that there would be nearly 27,000 buildings which would sustain at least moderate damage which is over 11% of the total buildings in the region. An estimated 71,000 buildings would receive minor damage. There would be an estimated 1300 buildings that will be completely destroyed. The great majority of these would be wooden residential structures. Ten of the region's eleven hospitals and seven of the region's 328 schools would suffer minor or moderate damage. No critical facilities are estimated to suffer complete damage. Over 6,000 households would be displaced and 1,600 people would seek short-term shelter in public shelters. The model estimates that a total of over 1.45 million tons of debris would be generated. The majority of this would be tree debris. However, over 14,000 truckloads of building debris would need to be removed. Table 7 below displays the total economic losses and numbers of buildings with moderate or worse damage estimated by the Hazus-MH model runs for each municipality in the Region.

Table 7: Hazus-MH Loss Estimations by Municipality for a Category 3 Hurricane Based on the 1938 Hurricane

Municipality	Total Estimated Economic Losses due to Hurricane	Buildings at Least Moderately Damaged	Municipality	Total Estimated Economic Losses due to Hurricane	Buildings at Least Moderately Damaged
ANDOVER	$14,800,000	126	MANCHESTER	$319,740,000	2,475
AVON	$69,000,000	372	MARLBOROUGH	$29,657,000	228
BLOOMFIELD	$86,400,000	742	NEWINGTON	$168,800,000	1,340
BOLTON	$25,315,000	227	ROCKY HILL	$115,185,000	827
CANTON	$19,900,000	148	SIMSBURY	$88,800,000	512
EAST GRANBY	$19,800,000	135	SOMERS	$38,200,000	301
EAST HARTFORD	$241,100,000	2009	SOUTH WINDSOR	$131,400,000	1009
EAST WINDSOR	$52,460,000	22	STAFFORD	$55,122,000	419
ELLINGTON	$87,370,000	699	SUFFIELD	$56,400,000	465
ENFIELD	$183,300,000	1,509	TOLLAND	$55,600,000	402
FARMINGTON	$99,840,000	667	VERNON	$139,900,000	1,182
GLASTONBURY	$210,906,000	1,342	WEST HARTFORD	$355,325,000	2,358
GRANBY	$29,947,000	200	WETHERSFIELD	$154,000,000	1,280
HARTFORD	$564,530,000	3134	WINDSOR	$135,530,000	978
HEBRON	$46,100,000	335	WINDSOR LOCKS	$54,270,000	479

We also analyzed the impacts the region would experience if a hurricane with a probability of occurring once in a hundred years were to hit the Region. This is a less severe storm than the 1938 Hurricane and the damages while substantial would be less. In such a storm we would experience peak wind gusts of predominately 80-95 mph. HAZUS software estimates that there would be over 2,000 buildings which would sustain at least moderate damage which is about 1% of the total buildings in the region. There would be an estimated 12 buildings that will be completely destroyed. Four of the region's eleven hospitals and none of the region's 328 schools would suffer minor or moderate damage. No critical facilities are estimated to suffer complete damage. The model estimates that a total of over 360,000 tons of debris would be generated. The majority of this would be tree debris. However, over 2,500 truckloads of building debris would need to be removed.

We also used the Hazus software to model the impacts a hurricane with a probabilistic 20-year return period would have on the Region. In such a storm we would experience peak wind gusts of 50-65 mph. Hazus estimates significantly less damage from the winds of such a hurricane. In fact, only nine buildings were estimated to be at least moderately damaged and none would be completely damaged although nearly 250 buildings would suffer minor damage. Nearly 15,000 tons of debris would be generated. The majority of this would be tree debris and only 21 truckloads of building debris would need to be removed.

While the Region could experience severe and widespread losses from rare, strong hurricanes, this hazard poses moderate risk for the Capitol Region, given that coastal Connecticut bears the initial brunt of such storms.

FEMA Team Meeting in Hartford in Response to Hurricane Irene, 2011, Credit: FEMA.

Manchester Shelter, October 31, 2011, Credit: CTNow.

Saffir-Simpson Hurricane Wind Scale

	Sustained Winds	Types of Damage Due to Hurricane Winds
1	74-95 mph 64-82 kt 119-153 km/h	**Very dangerous winds will produce some damage:** Well-constructed frame homes could have damage to roof, shingles, vinyl siding and gutters. Large branches of trees will snap and shallowly rooted trees may be toppled. Extensive damage to power lines and poles likely will result in power outages that could last a few to several days.
2	96-110 mph 83-95 kt 154-177 km/h	**Extremely dangerous winds will cause extensive damage:** Well-constructed frame homes could sustain major roof and siding damage. Many shallowly rooted trees will be snapped or uprooted and block numerous roads. Near-total power loss is expected with outages that could last from several days to weeks.
3 (major)	111-129 mph 96-112 kt 178-208 km/h	**Devastating damage will occur:** Well-built framed homes may incur major damage or removal of roof decking and gable ends. Many trees will be snapped or uprooted, blocking numerous roads. Electricity and water will be unavailable for several days to weeks after the storm passes.
4 (major)	130-156 mph 113-136 kt 209-251 km/h	**Catastrophic damage will occur:** Well-built framed homes can sustain severe damage with loss of most of the roof structure and/or some exterior walls. Most trees will be snapped or uprooted and power poles downed. Fallen trees and power poles will isolate residential areas. Power outages will last weeks to possibly months. Most of the area will be uninhabitable for weeks or months.
5 (major)	157 mph or higher 137 kt or higher 252 km/h or higher	**Catastrophic damage will occur:** A high percentage of framed homes will be destroyed, with total roof failure and wall collapse. Fallen trees and power poles will isolate residential areas. Power outages will last for weeks to possibly months. Most of the area will be uninhabitable for weeks or months.

Source: National Hurricane Center, NOAA

Floods

Flooding can occur as a result of other natural hazards such as heavy precipitation, hurricanes, winter storms, snow melt, ice jams or dam failures. The Capitol Region's numerous rivers and streams, as well as its urbanized areas, make floods and flash floods a regular risk. Individuals and local governments face significant economic loss, risks to public safety, and degraded waterways from flooding. There is not a "flood season" per se in Connecticut; however, waterways are normally higher during spring, and are thus especially vulnerable to flooding from intense precipitation. According to the State's Plan, major flooding of small rivers and loss of life can be expected every 5-10 years throughout the State. Major flooding of larger rivers, such as the Connecticut and Farmington, with loss of life and structural damage can be expected once every 30 years. While inundation-related flood loss is a significant component of flood disasters, fluvial (river-related) erosion is another significant source of damage.

Historic floods of the 1930s and 1950s resulted in widespread damage in Connecticut. According to accounts from the National Atmospheric and Oceanic Administration (NOAA), in March 1936, the combination of several heavy rain events and melting snow resulted in major flooding throughout New England. New flow records were established on the Connecticut River in Hartford and other locations upstream. Flooding was again widespread in New England following the Hurricane of 1938. The Flood of 1955 was one of the worst in Connecticut's history. It resulted from heavy rains caused by the back-to-back hurricanes in August. Also according to NOAA, Hurricane Connie produced 4-6 inches of rainfall over southern New England on August 11 and 12, saturating the ground and raising river and reservoir levels to above normal levels. Then Hurricane Diane came a week later and "dealt a massive punch" to New England. Rainfall totals from Diane ranged up to nearly 20 inches over a two day period. The headwaters of the Farmington River in Connecticut recorded 18 inches in a 24-hour period. These were record accumulations. Damage was widespread throughout Connecticut. Table 6 below summarizes the damages experienced in the Capitol Region communities.

Heavy rainfall in June 1982 also resulted in record floods on the Farmington River and many smaller streams through the central part of the state. According to NOAA, "One of the ironies of this event was that one of the facilities that was impacted was the Northeast River Forecast Center. The NERFC offices, which at that time were located in Bloomfield CT, were flooded for a day. Staff had to move to other locations including one home in order to complete their forecast responsibilities. The floods caused the loss of at least eleven lives. In addition damage estimates of approximately 230 million dollars were incurred. Thousands of homes suffered varying degrees of damage. One significant development from the aftermath of this flooding was the development of a statewide flood warning system under the management of the Connecticut Department of Environmental Protection. While this will not prevent flooding to occur in the future, it may help provide advance warning and prevent the loss of lives and property."

Table 8: Damage Estimates to Capitol Region Municipalities from the August 1955 Flood

Summary of Damage Estimates - August 19, 1955 Flood						
Capitol Region Municipality	**Public Facilities**	**Residential**	**Industrial**	**Business**	**Private Schools, Churches, & Institutions**	**Total**
Avon	$18,184	$100,000		$16,500		$134,684
Bloomfield	$17,500	$17,500	$22,500	$66,250	$1,600	$125,350
Canton	$80,000	$215,000	$1,000,000	$219,275		$1,514,275
East Granby	$47,000	$480,000				$527,000
East Hartford	$35,000					$35,000
East Windsor	$20,000	$35,000	$6,500	$41,000		$102,500
Ellington	$35,000					$35,000
Enfield	$55,000					$55,000
Farmington	$200,000	$1,800,000	$1,700,000	$500,000		$4,200,000
Glastonbury	$8,000	$10,000	$58,300	$14,550		$90,850
Granby	$455,000	$15,110	$14,000			$484,110
Hartford	$25,000	$1,500,000	$1,800,000	$270,000	$100,000	$3,695,000
Manchester	$12,095					$12,095
Rocky Hill		$2,000				$2,000
Simsbury	$57,350	$350,000				$407,350
Somers	$175,000					$175,000
South Windsor	$5,000	$50,000				$55,000
Stafford	$150,000					$150,000
Suffield	$75,000	$50,000				$125,000
Tolland	$11,000					$11,000
West Hartford	$62,065	$255,000		$545,000		$862,065
Wethersfield	$2,500	$75,000	$10,000			$87,500
Windsor	$78,500	$50,000	$100,000	$11,500		$240,000
Windsor Locks	$10,000					$10,000
Capitol Region	**$1,634,194**	**$5,004,610**	**$4,711,300**	**$1,684,075**	**$101,600**	**$13,135,779**

Source: Report of the Connecticut Flood Recovery Committee to Governor Abraham Ribicoff, November 3, 1955, www.cslib.org/floodrecov.pdf.

The State and region have benefited from flood control projects spawned by the historic floods of the 1930s and 1950s, as well as innovations in response measures, such as the Automated Flood Warning System, which followed major flooding in 1982. Nevertheless, the severe flooding of October 2005 demonstrated once again the region's vulnerability to this hazard.

October 2005 Flooding of Capitol Region Rivers and Streams		
River/Stream	**Flooding Severity**	**Recurrence Interval**
Broad Brook	Major	> 100-year
Connecticut River	Minor	2-Year
Hockanum River	Moderate	25-Year
Stony Brook	Moderate	40-Year

Two heavy rainfalls during the week of October 7-15, 2005 caused major flooding in several small rivers in Hartford and Tolland Counties, and moderate flooding elsewhere. Several dams were breached, and roads and bridges washed out. The storms flooded many basements, and some towns conducted evacuations because of severe urban flooding. Interstate 91 developed a sinkhole in Windsor. Enfield was particularly hard hit. The storms produced sufficient damage to provoke a federally declared major disaster in certain counties, including Tolland ($1.16 million), and eventually, Hartford County ($2.52 million).

Route 191, East Windsor
From http://ct.water.usgs.gov/DATA/floodindex.html

Municipality	Rainfall for Week of Oct. 7-15, 2005
Enfield	15.90"
Farmington	11.61"
Glastonbury	13.27"
Hartford	10.51"
South Windsor	15.90"
Wethersfield	13.22"
Windsor Locks	13.12"

The National Weather Service's Storm Events Database lists a number of other flooding events in the Capitol Region over the two decades including the following:

July 8, 1995: Thunderstorms produced very heavy rainfall. One road was reported to be impassable between Ellington and Stafford Springs and overflow and street flooding was reported on secondary roads off of Route 84.

January 24, 1996: Strong south winds with gusts to 40 to 60 mph and isolated gusts to hurricane force preceded a sharp cold front. Peak wind gusts to 58 mph were recorded at both Bradley International Airport in Windsor Locks and at Glastonbury. There were scattered reports of wind damage including downed trees, downed tree limbs, and scattered power outages. Part of a roof of a Hartford apartment building was damaged, displacing about 15 people. Power outages affected up to 41,000 electric customers statewide. The high winds also brought a strong January thaw with temperatures rising into the 50s. This combined with rain and melting snow to cause some street flooding. Flash flooding occurred in West Hartford and Hartford, where homes flooded and roads washed out along the upper portion of the South Branch of the Park River and also along the North Branch of the Park River in the parking lots at the University of Hartford and Hartford Community College.

April 16, 1996: Two to 3 inches of rain fell on April 16th in northern Connecticut, with totals of 3 to 5 inches in the south portion of Hartford and Tolland Counties. All of the rain fell in about a 12-hour period. The ground had remained saturated from heavy snowmelt during the previous week and this combined with the heavy rain to produce urban flooding, flooding of small streams, and finally minor to moderate flooding of the major rivers resulting in the most significant main stem river flooding along the Connecticut River in 9 years. In general, during this event low-lying riverfront land and some roads were flooded, but no significant damage was reported.

July 13, 1996: Tropical Storm Bertha brought heavy rainfall totals of three to five and one-half inches as the center of the storm passed over the southeast part of Connecticut, moving northeast. The maximum rainfall reported was 5.5 inches at Vernon. Urban street flooding occurred throughout the area and minor river flooding occurred along the North Branch of the Park River in Hartford.

December 2, 1996: Heavy rainfall amounts of 2 to 3 inches on the first and second of the month combined with some snow melt in the Connecticut River Basin to produce runoff, which resulted in minor flooding of several small streams and flooding along the Connecticut River below Thompsonville.

August 29, 1997: A cold front moving very slowly across Connecticut caused an area of showers and thunderstorms that produced intense rainfall amounts of 3 to 6 inches in 1 to 3 hours across parts of Hartford County. A flash flood occurred in Manchester where Bigelow Brook rose at least 6 feet out of its banks, flooding roads and basements. Sixteen homes received extensive water damage. A majority of these had basement flooding. Three homes had total basement failure or collapse. One home was severely damaged. Many residents had to be evacuated to local shelters. Electric power was disrupted for 1,200 customers. A local shopping area also was flooded. An estimated 6 to 12 automobiles received extensive water damage when water rose to at least as high as the windows. Property damage was likely a half of a million dollars. Maximum rainfall totals reached 5 to 6 inches in the area of the flash flood and there was extensive urban street flooding in addition to the flash flood. The cloudburst was really confined to Manchester. Only one town away in Vernon, there was heavy rain but no flooding was reported.

March 9, 1998: A powerful storm system moving slowly northeast from the Ohio Valley to the eastern Great Lakes brought strong winds and heavy rainfall to Connecticut, which resulted in urban street flooding, basement flooding, small stream flooding, and main stem river flooding. At times, the rainfall was torrential, especially in thunderstorms during the evening hours.

June 30, 1998: An area of heavy showers and thunderstorms associated with a slow moving warm front brought 2 to 4 inches of rainfall to Hartford County resulting in urban street, basement, small stream, and river flooding. In West Hartford, the Trout Brook went over its banks flooding nearby areas. Urban street flooding was reported with water four feet deep on Pen Drive and one foot deep in some other areas.

September 16, 1999: Tropical Storm Floyd brought torrential rainfall and strong winds to northern Connecticut, as it tracked up the Connecticut River valley into central Massachusetts. Although many areas received torrential rainfall, with totals between 4 and 8 inches, the heaviest rain fell in western Hartford County where as much as 10.80 inches was reported in Bristol. The rainfall produced widespread flooding of low-lying areas, especially in Hartford County. Surprisingly, no flood damage was reported, even in those areas where the smaller rivers rose rapidly. Strong winds were also felt in northern Connecticut as Floyd passed. There were scattered reports of small trees or branches downed, which did not cause significant damage.

June 2, 2000: Severe thunderstorms moved across northern Connecticut in advance of a strong cold front. The storms moved through late in the afternoon and early evening. In Hartford County, a spotter in Granby reported nickel to quarter size hail, and observed a funnel cloud near State Route 20. The hail accumulated two inches deep. In Ellington, in Tolland County, thunderstorm winds downed two large trees, and torrential rainfall caused flash flooding of a small stream in the vicinity of Pinney Road.

May 28, 2003: A slow moving severe thunderstorm produced penny sized hail in Enfield and Manchester. The storm then dumped 3 to 4 inches of rain in Bloomfield, West Hartford, and Hartford in less than one hour. This resulted in flash flooding on Beaman Brook in Bloomfield, and significant urban flooding in West Hartford and Hartford. Dozens of cars were submerged in flood waters and several people needed to be rescued. The north end of West Hartford along Trout Brook Drive was hardest hit, along with the neighborhood surrounding Bloomfield High School. There were no injuries reported. Lightning from the storm struck several houses in West Hartford causing minor damage. Power was briefly knocked out in West Hartford and Windsor, cutting off service to thousands of customers.

July 15, 2005: Slow moving, nearly stationary, thunderstorms produced heavy downpours that lead to flash flooding and road closures in Hartford County. No direct injuries resulted from these storms.

July 27, 2005: A hot and humid air mass combined with an approaching cold front sparked strong to severe thunderstorms. These thunderstorms produced severe winds, damaging lightning and flash flooding across north central and northeast Connecticut, especially Hartford County. The severe winds

brought trees, utility poles, and power lines down. In Hebron, approximately 40 trees were knocked down as these storms pushed through the area. Lightning and flash flooding were also produced from these storms. In Hartford, lightning destroyed a wooden shed. In East Hartford, flash flooding left cars stranded on a road. No direct injuries resulted from these storms, however.

April 16, 2007: An unusually strong and slow moving coastal storm for mid April tracked to western Long Island Sound on April 16th before weakening slowly and drifting offshore. This storm brought strong winds and widespread river and stream flooding to northern Connecticut. Northeast winds gusted as high as 55 mph in the higher elevations of Tolland and Windham Counties. Rainfall totals of 3 to 5 inches, combined with wet antecedent conditions, resulted in widespread river and stream flooding, as well as significant flooding of urban areas. Minor to moderate flooding occurred on the Farmington and Connecticut Rivers. The Connecticut River at Thompsonville crested at 7 feet at 3 pm on the 17th (flood stage is 5 feet), and at Hartford it crested at 23.4 feet at 1215 pm on the 18th (flood stage is 16 feet). On the Farmington River, a crest of 16.6 feet was recorded at Simsbury at 915 am on the 17th (flood stage is 12 feet), while at Tarriffville the river crested at 9.9 feet at 430 pm on the 17th (flood stage is 9 feet). The Hockanum River in Manchester came out of its banks and threatened nearby homes. Several roads were flooded in Granby.

September 28, 2008: Tropical Storm and then Hurricane Kyle moved east of Massachusetts on its trek towards Maine and Nova Scotia. The effects of Kyle were minimal on Southern New England with heavy rainfall and high surf the only concerns. Kyle, combined with a separate coastal storm that moved through Southern New England the day before, produced anywhere from two to seven inches of rain. This resulted in significant flooding across two counties in southeastern Massachusetts and flash flooding in Hartford County, Connecticut. Heavy rainfall behind Tropical Storm Kyle resulted in flash flooding across Hartford. On Elliot Street and on Flatbush Avenue, a total of six cars were stuck in flood waters. Numerous basements were flooded on both Maple and Wethersfield Avenues and on Parkview Drive.

March 7, 2011: Heavy rains with amounts ranging 2 to 5 inches across coastal and interior New England coupled with melting snows resulted in flooding of tributaries and major rivers, inundating local neighborhoods and roadways. Several rivers and small streams in Hartford County flooded including the Farmington River at Tarriffville, Unionville, and Simsbury; the Hockanum River at East Hartford and the Connecticut River at Hartford. In addition, basements were flooded in Avon, Windsor and Windsor Locks. Bloomfield Avenue was closed near the Bloomfield/Windsor line because a nearby pond overflowed its banks. Several intersections were flooded, including the intersection of Old Farms and Tillotson Roads in Avon and the intersection of Wolcott and Wescott Roads in Simsbury. In Ellington, Route 140 was closed near its intersection with Route 30 because of flooding. Portions of Freshwater Boulevard in Enfield were flooded. In Somers, portions of Durkee, Four Bridges, and King Roads adjacent to the Scantic River flooded.

September 8, 2011: A slow moving cold front moved across Southern New England and stalled just south of the area. This front was instrumental in bringing tropical moisture from the remnants of Tropical Storm Lee into New England resulting in several periods of showers and steady rainfall. Rainfall totals throughout the area over the four days totaled anywhere from two to eight inches, with most areas receiving four to six inches. This resulted in flooding both on the rivers and small streams and in urban areas. The bulk of the flooding in urban areas occurred on Sept. 8 as a band of very heavy rain moved through, dumping up to two inches of rain in an hour to hour and a half in some locations. Numerous roads were closed throughout Bloomfield because of water one to two feet deep over the roads. In addition, a ten foot section of Bloomfield Avenue was washed out near the intersection of Bloomfield Avenue and Route 218. Dozens of cars in Parking Lot E of the University of Hartford were floating after the north branch of the Park River overflowed its banks into the parking lot. University officials said it was only the second time in the past 15 years that flooding had been this bad. In

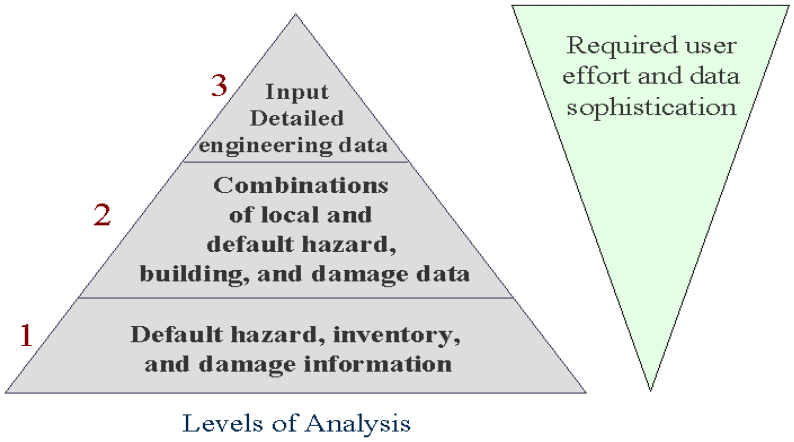
addition, several main stem rivers experienced flooding, including: the Farmington River at Simsbury and Unionville and the Connecticut River at Thompsonville and Hartford. No damage associated with this flooding was reported.

July 28, 2012: Several areas of low pressure along a stationary front stalled across Southern New England producing very heavy rain showers and a few thunderstorms. Many locations received up to two to three inches in less than an hour. This resulted in flash flooding, particularly in more urban areas. Route 190 and Stafford Road in Stafford was flooded with two feet of water, cars were stuck in the flood waters. In Stafford Springs, the parking lot in front of the Stafford Springs Savings Bank was flooded with one foot of water.

Assessing the Risks We Face From Flooding

To help assess the risks we face from major flooding, CRCOG used FEMA's Hazus-MH loss estimation program to model the effects of flooding primarily at the local level. The Hazus-MH model has three levels of analysis depending upon the data used for the analyses. CRCOG performed Level 1 Analyses which rely on default data provided with the software. At this level, loss estimates are approximate and the analysis does not include damage/loss due to ground failure or erosion (riverine only), damage/loss due to earthquake driven flooding, or damage/loss due to dam failure. Level 2 Analysis improves Level 1 results and requires more extensive inventory data and effort than the Level 1 Analysis. However, it is likely that we would need to employ consultants to assist in the implementation of certain processes. For example, knowledgeable users of hydrology and hydraulics models are required to define flood elevations. Level 3 analyses require extensive efforts in developing information on the flood hazards and the measures of exposure. This type of analysis incorporates results from engineering and economic studies carried out using methods and software not included within the software. At this level, one or more technical experts would be required to acquire data, perform detailed analyses, assess damage/loss, and assist in gathering extensive inventory data. It is anticipated that at this level there would need to be extensive participation by local utilities and owners of special facilities. A multi-year effort would likely be required to complete a Level 3 Analysis. Level 2 and 3 Analyses are beyond the scope of this planning process.

Figure 2: Hazus-MH Levels of Analysis and User Sophistication



Source: Hazus-MH MR4 User Manual, FEMA

Our use of Hazus modeling provided a rough approximation of the damages each municipality could experience from 100 year (1%) flooding. Table 9 below shows the damages each town in the region might face from a flood with a 1% probability of occurring in any given year (i.e., the 100 year flood). As can be seen, losses could be expected to be particularly high for Farmington River Valley communities. In all, the Capitol Region could experience losses of over $1.6 billion from such major flooding. (Summaries of the 100 year flood risk assessments are provided in the municipal sections of this Plan and copies of the event reports from the model runs are provided in the Appendix.)

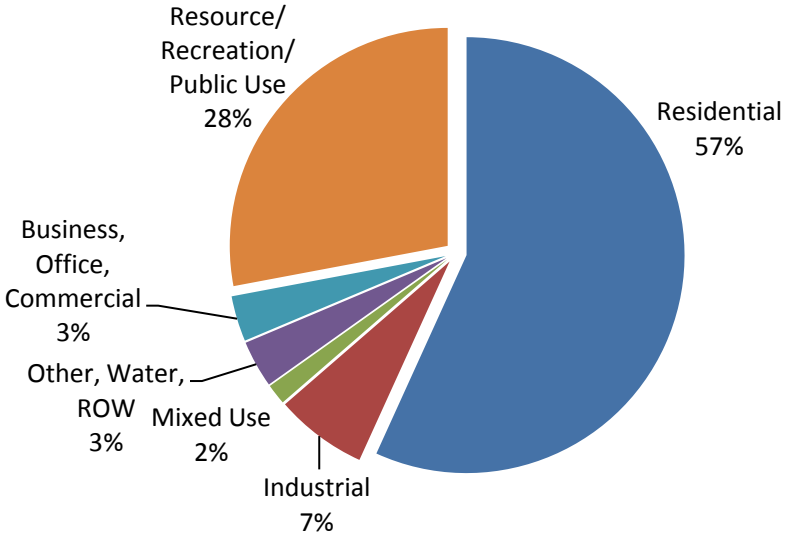
Table 9: Estimated Losses to Capitol Region Communities from 100 Year Flood Events

Municipality	Total Estimated Economic Losses from a 100 Year Flood	Buildings at Least Moderately Damaged	Municipality	Total Estimated Economic Losses from a 100 Year Flood	Buildings at Least Moderately Damaged
ANDOVER	$10,290,000	8	MANCHESTER	$64,350,000	11
AVON	$179,770,000	114	MARLBOROUGH	$5,170,000	2
BLOOMFIELD	$21,720,000	30	NEWINGTON	$15,730,000	23
BOLTON	$1,970,000	0	ROCKY HILL	$4,740,000	1
CANTON	$52,170,000	34	SIMSBURY	$102,150,000	135
EAST GRANBY	$13,340,000	13	SOMERS	$12,790,000	10
EAST HARTFORD	$33,550,000	41	SOUTH WINDSOR	$33,240,000	48
EAST WINDSOR	$17,970,000	26	STAFFORD	$50,620,000	27
ELLINGTON	$11,120,000	0	SUFFIELD	$24,030,000	12
ENFIELD	$91,120,000	135	TOLLAND	$13,400,000	11
FARMINGTON	$228,470,000	393	VERNON	$50,460,000	76
GLASTONBURY	$35,720,000	10	WEST HARTFORD	$130,710,000	140
GRANBY	$42,450,000	66	WETHERSFIELD	$20,960,000	7
HARTFORD	$206,450,000	61	WINDSOR	$132,710,000	292
HEBRON	$4,400,000	0	WINDSOR LOCKS	$2,420,000	0

Other means can also provide insights into the risks our communities face from flooding. Analysis of the types of land uses within FEMA designated 100 year flood zones gives some indication of the type of damage that flooding can cause in the region.

Figure 3 and Table 10 reveal percentages of general land uses, based on municipal zoning districts, in the 100 Year Flood Zone in each municipality. Generally, about half of the Region's land in flood zones is zoned residential, while over a quarter is zoned resource or recreation. Residential areas in flood zones are of particular concern for risk from this hazard.

Figure 3: Capitol Region Zoning in FEMA Flood Zones



How do you explain the 1% annual chance of flooding (100 year event)?

The 1% annual chance exceedance flood sometimes referred to as the 100-year flood, or base flood, has a 1% chance of occurring in any given year. It is not a safety standard, and it has been set as the level that flood insurance is not required if the 1% annual chance flood can be excluded from the floodplain. Although a 1% annual chance flood sounds remote, keep in mind that over the life of an average 30-year mortgage, a home located within the 1% flood zone (A or V zone) has a 26% chance of being inundated by the size flood. This same home has less than a 1% chance of fire damage during the same period. What is more significant is the house in a 10-year flood area is almost certain to see a 10-year flood (96% chance) in the same 30-year mortgage cycle. In many areas the difference in flood heights between a 10% and a 1% event is less than one foot.

Flood Frequency Chart

Flood frequency (years)	Chance of flooding in any given year	Percent chance of flooding during 30-year mortgage
10	10 out of 100 (10%)	96%
50	2 out of 100 (2%)	46%
100	1 out of 100 (1%)	26%
500	0.2 out of 100 (0.2%)	6%

Source: U.S. Army Corps of Engineers, Flood Risk Management Program, http://www.nfrmp.us/faqtypical.cfm#question5

Table 10: Percent of Land Uses (by Zoning District Category) in FEMA Flood Zones

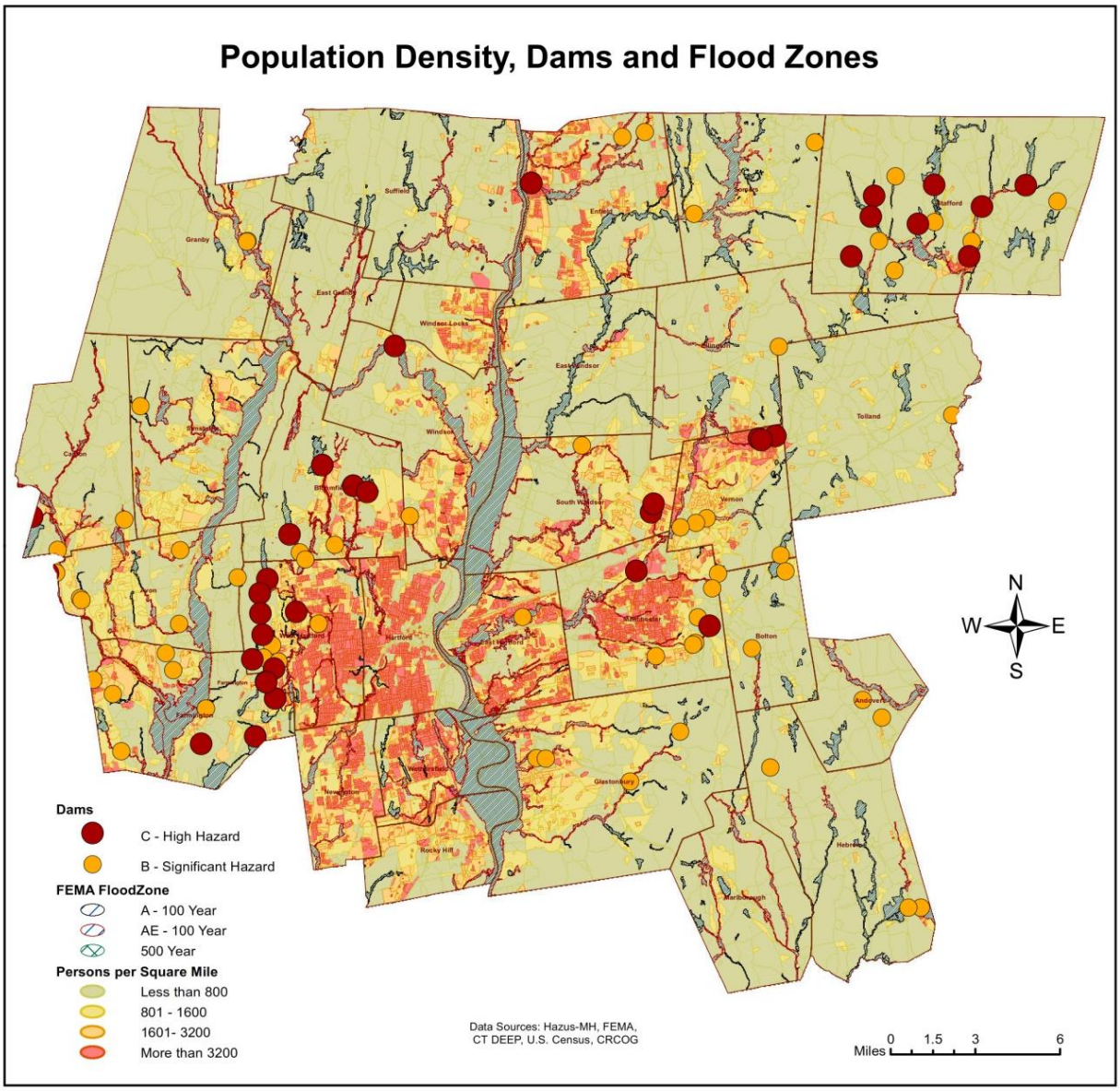
MUNICIPALITY		ZONING CATEGORY	Total Acres in 100 Year Flood Plain	Percent of Flood Plain Land by Zoning Category
ANDOVER				
Town Total Acres	**10057**	Business/Commercial/Office	35	4.7%
Total Acres in 100 Year Flood Plain	**750**	Industrial	116	15.4%
% Town in Flood Plain	**7.5%**	Residential	166	22.1%
		Resource/Recreation/Public Use	287	38.2%
		Water	148	19.7%
AVON				
Town Total Acres	**14989**	Business/Commercial/Office	39	2.2%
Total Acres in 100 Year Flood Plain	**1779**	Industrial	56	3.2%
% Town in Flood Plain	**11.9%**	Residential	602	33.9%
		Resource/Recreation/Public Use	1081	60.8%
BLOOMFIELD				
Town Total Acres	**16872**	Business/Commercial/Office	15	0.9%
Total Acres in 100 Year Flood Plain	**1748**	Industrial	145	8.3%
% Town in Flood Plain	**10.4%**	Mixed Use	140	8.0%
		Residential	1447	82.8%
BOLTON				
Town Total Acres	**9433**	Business/Commercial/Office	12	2.7%
Total Acres in 100 Year Flood Plain	**433**	Industrial	11	2.4%
% Town in Flood Plain	**4.6%**	Residential	411	94.9%
CANTON				
Town Total Acres	**16018**	Business/Commercial/Office	30	3.9%
Total Acres in 100 Year Flood Plain	**770**	Industrial	81	10.5%
% Town in Flood Plain	**4.8%**	Residential	659	85.6%
EAST GRANBY				
Town Total Acres	**11217**	Business/Commercial/Office	88	8.8%
Total Acres in 100 Year Flood Plain	**994**	Industrial	19	1.9%
% Town in Flood Plain	**8.9%**	Mixed Use	13	1.4%
		Residential	216	21.7%
		Resource/Recreation/Public Use	658	66.2%
EAST HARTFORD				
Town Total Acres	**12040**	Business/Commercial/Office	529	22.4%
Total Acres in 100 Year Flood Plain	**2362**	Industrial	83	3.5%
% Town in Flood Plain	**19.6%**	Mixed Use	113	4.8%
		Residential	1638	69.3%
EAST WINDSOR				
Town Total Acres	**17108**	Business/Commercial/Office	37	2.3%
Total Acres in 100 Year Flood Plain	**1575**	Industrial	182	11.6%
% Town in Flood Plain	**9.2%**	Mixed Use	20	1.3%
		Residential	1336	84.8%
ELLINGTON				
Town Total Acres	**22140**	Business/Commercial/Office	66	4.3%
Total Acres in 100 Year Flood Plain	**1532**	Industrial	168	11.0%
% Town in Flood Plain	**6.9%**	Residential	890	58.1%
		Resource/Recreation/Public Use	87	5.7%
		Water	321	20.9%
ENFIELD				
Town Total Acres	**21890**	Business/Commercial/Office	154	7.2%
Total Acres in 100 Year Flood Plain	**2158**	Industrial	185	8.6%
% Town in Flood Plain	**9.9%**	Mixed Use	6	0.3%
		Residential	1257	58.3%
		ROW	37	1.7%
		Water	518	24.0%

FARMINGTON				
Town Total Acres	**18384**	Business/Commercial/Office	99	3.1%
Total Acres in 100 Year Flood Plain	**3146**	Industrial	228	7.3%
% Town in Flood Plain	**17.1%**	Mixed Use	9	0.3%
		Residential	839	26.7%
		Resource/Recreation/Public Use	1971	62.6%
GLASTONBURY				
Town Total Acres	**33413**	Business/Commercial/Office	14	0.4%
Total Acres in 100 Year Flood Plain	**3327**	Industrial	10	0.3%
% Town in Flood Plain	**10.0%**	Mixed Use	28	0.9%
		Residential	159	4.8%
		Resource/Recreation/Public Use	3056	91.9%
		ROW	60	1.8%
GRANBY				
Town Total Acres	**26301**	Business/Commercial/Office	11	1.0%
Total Acres in 100 Year Flood Plain	**1147**	Industrial	57	5.0%
% Town in Flood Plain	**4.4%**	Mixed Use	178	15.5%
		Residential	882	76.9%
		ROW	19	1.6%
HARTFORD				
Town Total Acres	**11553**	Business/Commercial/Office	14	2.2%
Total Acres in 100 Year Flood Plain	**661**	Industrial	81	12.3%
% Town in Flood Plain	**5.7%**	Mixed Use	15	2.3%
		Residential	209	31.7%
		Resource/Recreation/Public Use	341	51.7%
HEBRON				
Town Total Acres	**23938**	Industrial	38	2.4%
Total Acres in 100 Year Flood Plain	**1607**	Mixed Use	3	0.2%
% Town in Flood Plain	**6.7%**	Residential	1565	97.4%
MANCHESTER				
Town Total Acres	**17704**	Business/Commercial/Office	49	5.9%
Total Acres in 100 Year Flood Plain	**823**	Industrial	167	20.3%
% Town in Flood Plain	**4.6%**	Mixed Use	4	0.5%
		Residential	552	67.1%
		ROW	51	6.2%
MARLBOROUGH				
Town Total Acres	**15032**	Business/Commercial/Office	21	2.0%
Total Acres in 100 Year Flood Plain	**1045**	Industrial	30	2.9%
% Town in Flood Plain	**7.0%**	Residential	748	71.6%
		Resource/Recreation/Public Use	246	23.5%
NEWINGTON				
Town Total Acres	**8394**	Business/Commercial/Office	27	5.0%
Total Acres in 100 Year Flood Plain	**534**	Industrial	262	49.1%
% Town in Flood Plain	**6.4%**	Residential	222	41.7%
		ROW	23	4.2%
ROCKY HILL				
Town Total Acres	**8835**	Business/Commercial/Office	55	3.8%
Total Acres in 100 Year Flood Plain	**1461**	Mixed Use	2	0.1%
% Town in Flood Plain	**16.5%**	Residential	93	6.3%
		Resource/Recreation/Public Use	1301	89.1%
		ROW	10	0.7%
SIMSBURY				
Town Total Acres	**21970**	Business/Commercial/Office	17	0.6%
Total Acres in 100 Year Flood Plain	**3093**	Industrial	409	13.2%
% Town in Flood Plain	**14.1%**	Mixed Use	11	0.3%
		Residential	2656	85.9%
SOMERS				
Town Total Acres	**18318**	Business/Commercial/Office	3	0.2%
Total Acres in 100 Year Flood Plain	**2109**	Industrial	51	2.4%
% Town in Flood Plain	**11.5%**	Residential	2055	97.5%

SOUTH WINDSOR				
Town Total Acres	**18368**	Business/Commercial/Office	37	1.1%
Total Acres in 100 Year Flood Plain	**3386**	Industrial	121	3.6%
% Town in Flood Plain	**18.4%**	Mixed Use	24	0.7%
		Residential	3172	93.7%
		ROW	32	0.9%
STAFFORD				
Town Total Acres	**37568**	Business/Commercial/Office	111	4.2%
Total Acres in 100 Year Flood Plain	**2620**	Industrial	178	6.8%
% Town in Flood Plain	**7.0%**	Other	11	0.4%
		Residential	1198	45.7%
		Resource/Recreation/Public Use	659	25.1%
		ROW	94	3.6%
		Water	370	14.1%
SUFFIELD				
Town Total Acres	**27540**	Business/Commercial/Office	9	0.5%
Total Acres in 100 Year Flood Plain	**1834**	Industrial	328	17.9%
% Town in Flood Plain	**6.7%**	Mixed Use	16	0.9%
		Residential	1330	72.5%
		Resource/Recreation/Public Use	152	8.3%
TOLLAND				
Town Total Acres	**25740**	Business/Commercial/Office	2	0.1%
Total Acres in 100 Year Flood Plain	**1076**	Industrial	36	3.3%
% Town in Flood Plain	**4.2%**	Residential	1038	96.5%
VERNON				
Town Total Acres	**11601**	Business/Commercial/Office	82	10.8%
Total Acres in 100 Year Flood Plain	**753**	Industrial	25	3.3%
% Town in Flood Plain	**6.5%**	Mixed Use	73	9.6%
		Residential	537	71.3%
		Resource/Recreation/Public Use	37	4.9%
WEST HARTFORD				
Town Total Acres	**14336**	Business/Commercial/Office	15	1.5%
Total Acres in 100 Year Flood Plain	**975**	Industrial	29	3.0%
% Town in Flood Plain	**6.8%**	Residential	931	95.5%
		Resource/Recreation/Public Use	LT 1	0.0%
WETHERSFIELD				
Town Total Acres	**8430**	Business/Commercial/Office	57	2.3%
Total Acres in 100 Year Flood Plain	**2529**	Mixed Use	76	3.0%
% Town in Flood Plain	**30.0%**	Residential	552	21.8%
		Resource/Recreation/Public Use	1844	72.9%
WINDSOR				
Town Total Acres	**19868**	Business/Commercial/Office	27	1.1%
Total Acres in 100 Year Flood Plain	**2500**	Industrial	115	4.6%
% Town in Flood Plain	**12.6%**	Mixed Use	14	0.6%
		Residential	389	15.6%
		Resource/Recreation/Public Use	1954	78.2%
WINDSOR LOCKS				
Town Total Acres	**5977**	Business/Commercial/Office	2	1.2%
Total Acres in 100 Year Flood Plain	**157**	Industrial	133	84.9%
% Town in Flood Plain	**2.6%**	Residential	22	13.9%
CAPITOL REGION				
Region Total Acres	**525030**	**Business/Commercial/Office**	**1656**	**3.4%**
Total Acres in 100 Year Flood Plain	**48883**	**Industrial**	**3344**	**6.8%**
% Region in Flood Plain	**9.3%**	**Mixed Use**	**746**	**1.5%**
		Other	**11**	**0.0%**
		Residential	**27771**	**56.8%**
		Resource/Recreation/Public Use	**13674**	**28.0%**
		ROW	**325**	**0.7%**
		Water	**1356**	**2.8%**

The maps and data on the following pages which show the FEMA flood zones, the significant and high hazard dams (discussed in the following section) in the Capitol Region, flood insurance claims by town and repetitive flood loss claims illustrate the Capitol Region's potential for losses due to flooding. A review of flood insurance loss claims, and repetitive flood loss claims, from the past three decades indicates that flooding is a significant risk to the region not only because of its frequency, but also because of its damage potential.

Map 6: Capitol Region Population Density, Flood Plains, and High and Significant Hazard Dams



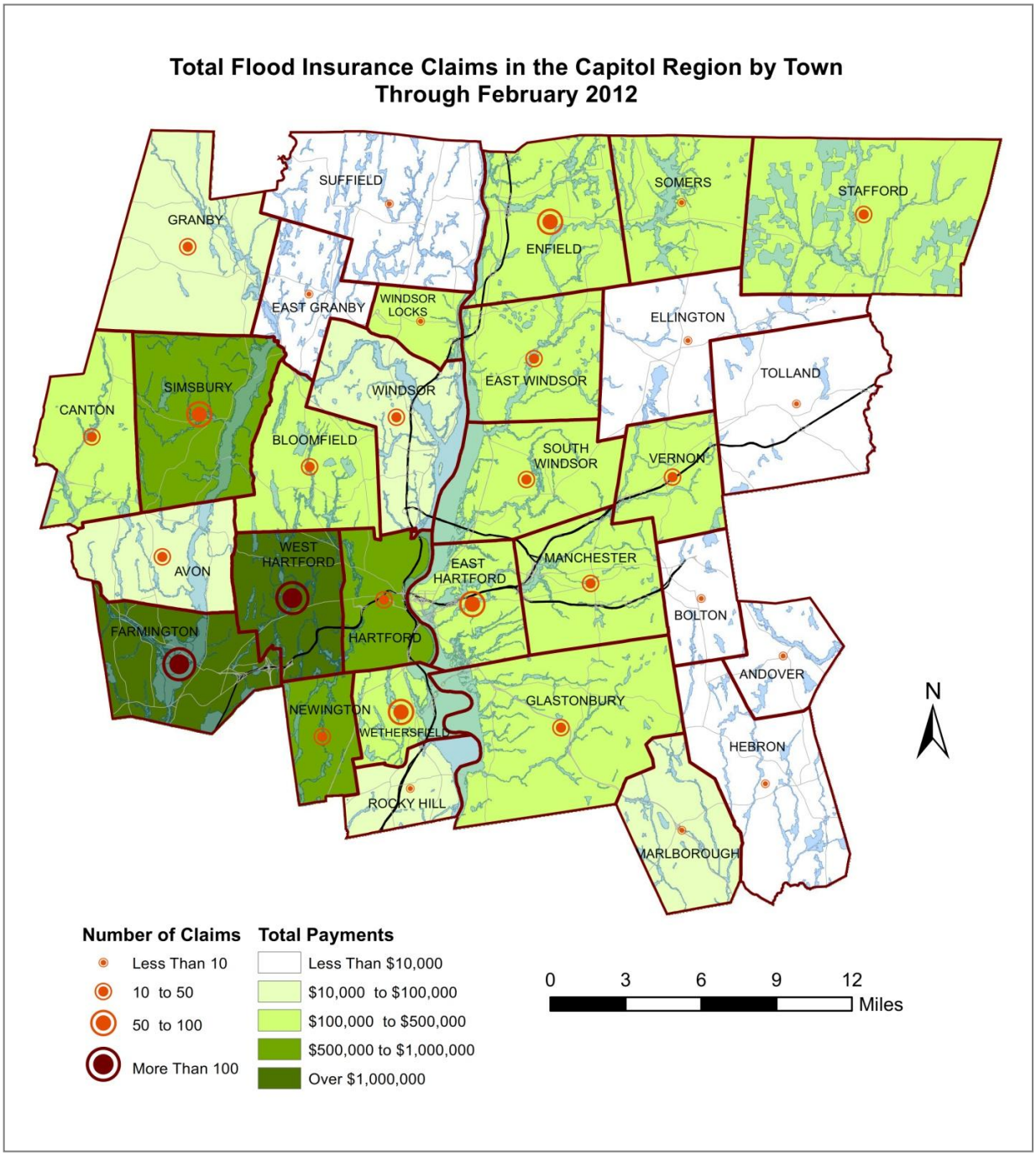
As seen in the table below, properties in Farmington and West Hartford have experienced substantial losses due to floods. Bloomfield, Canton, East Hartford, East Windsor, Enfield, Glastonbury, Hartford, Manchester, Newington, Simsbury, Somers, Stafford Springs, Vernon, Wethersfield, and Windsor Locks have also experienced large losses.

Table 11: National Flood Insurance Program Loss Statistics as of February 29, 2012

COMMUNITY NAME	TOTAL LOSS CLAIMS	TOTAL PAYMENTS	COMMUNITY NAME	TOTAL LOSS CLAIMS	TOTAL PAYMENTS
Andover	4	$4,980.94	Newington	43	$664,970.85
Avon	15	$50,059.02	Rocky Hill	10	$95,566.49
Bloomfield	41	$297,353.14	Simsbury	100	$526,615.71
Bolton	2	$3,989.54	Somers	10	$243,412.27
Canton	25	$122,853.58	South Windsor	16	$117,095.83
East Granby	3	$2,317.60	Stafford	4	$22,257.15
East Hartford	96	$455,077.42	Stafford Springs, Borough	28	$381,154.22
East Windsor	23	$281,501.59	Suffield	5	$5,733.52
Ellington	4	$8,954.08	Tolland	10	$9,289.54
Enfield	55	$292,021.82	Vernon	25	$149,474.90
Farmington	123	$1,189,996.47	West Hartford	318	$1,171,709.48
Glastonbury	44	$160,639.28	Wethersfield	66	$340,703.43
Granby	17	$98,904.16	Windsor Locks	9	$166,871.73
Hartford	50	$649,546.08	Windsor	25	$90,399.44
Hebron	3	$5,043.26	**TOTAL FOR CAPITOL REGION**	**1,208**	**$7,761,724.82**
Manchester	26	$106,584.64			
Marlborough	8	$46,647.64	**TOTAL FOR CONNECTICUT**	**20,832**	**$226,568,892.65**

Source: CT DEEP 05/10/12

Map 7: Total Flood Insurance Loss Claims and Payments for the Capitol Region as of February 2012



Data Source: CT DEEP 05/10/12

A Repetitive Loss Property (RLP) is any insurable building for which two or more claims of more than $1,000 were paid by the NFIP within any rolling 10-year period, since 1978. At least two of the claims must be more than 10-days apart but, within 10 years of each other. The table below shows the Capitol region communities which have experienced repetitive losses. Properties in Farmington, Simsbury, Newington, East Hartford, Enfield and West Hartford have experienced high repetitive loss payments. The municipalities of Andover, Bolton, East Granby, East Windsor, Ellington, Glastonbury, Hebron, Somers, Stafford, Suffield, Tolland, and Windsor Locks have not experienced repetitive loss claims as of June 2012.

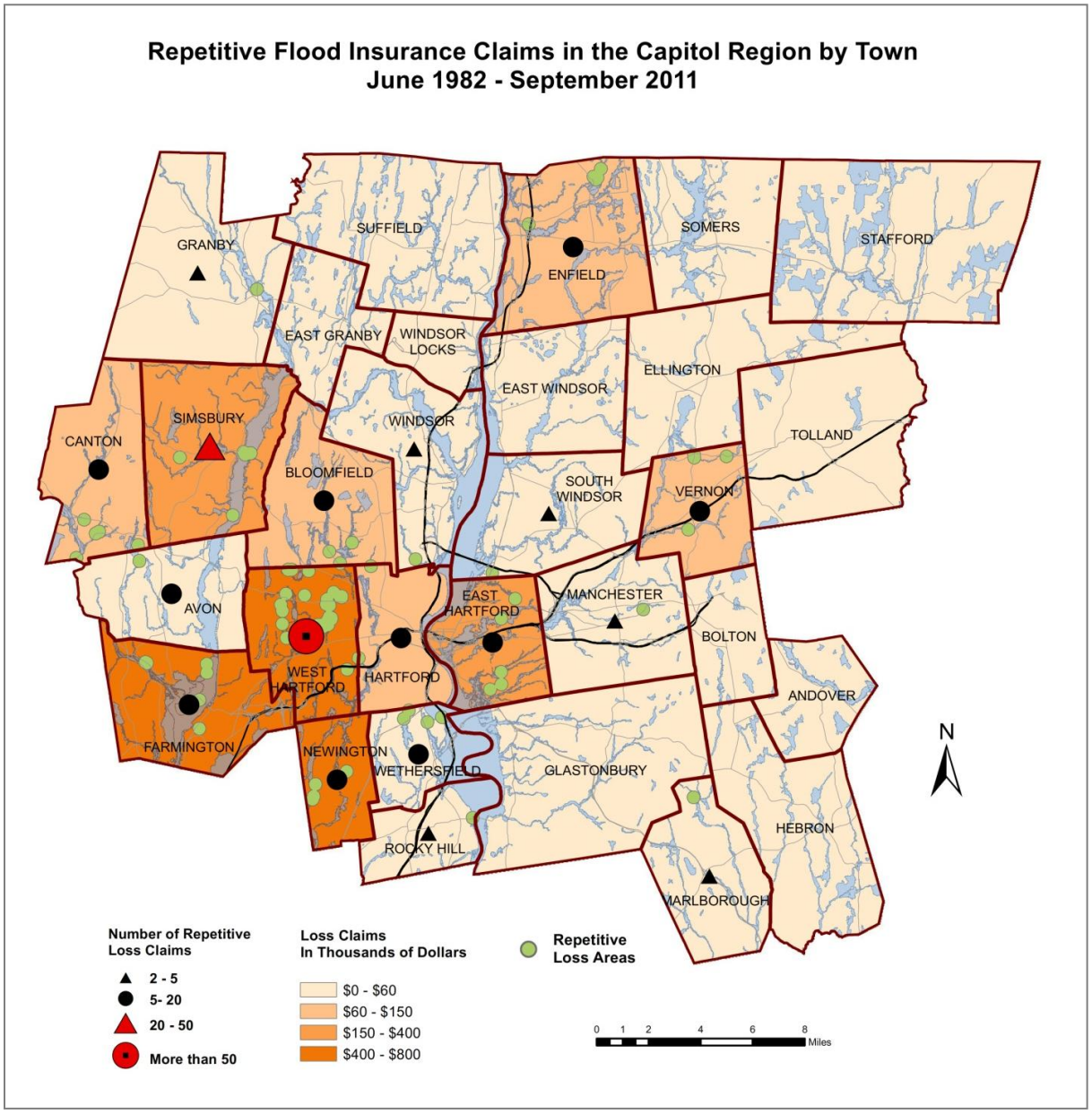
Table 12: National Flood Insurance Program Repetitive Loss Claims 1982-2011

Municipality	Building Payments	Contents Payments	Total Payments	Average Payments	Losses (#)	Properties (#)	Type of Property*
Avon	$41,717.80	$3,479.24	$45,197.04	$6,456.72	7	3	3-R
Bloomfield	$70,009.50	$716.00	$70,725.50	$7,858.39	9	3	3-R
Canton	$49,460.04	$21,436.90	$70,896.94	$4,431.06	16	6	5-R, 1-N
East Hartford	$210,352.42	$18,227.91	$228,580.33	$13,445.90	17	6	4-R, 2-N
Enfield	$138,408.65	$30,731.06	$169,139.71	$11,275.98	15	6	6-R
Farmington	$713,852.46	$83,712.20	$797,564.66	$39,878.23	20	6	4-R, 2-N
Granby	$14,146.60	$8,898.02	$23,044.62	$5,761.16	4	1	1-N
Hartford	$3,018.56	$80,029.08	$83,047.64	$9,227.52	9	2	1-R, 1-N
Manchester	$16,543.90	$26,660.04	$43,203.94	$10,800.99	4	2	1-R, 1-N
Marlborough	$6,386.46	$14.20	$6,400.66	$3,200.33	2	1	1-R
Newington	$135,900.45	$507,654.38	$643,554.83	$37,856.17	17	5	1-R, 4-N
Rocky Hill	$33,183.05	$8,276.65	$41,459.70	$20,729.85	2	1	1-R
Simsbury	$326,410.85	$62,787.63	$389,198.48	$8,460.84	46	11	11-R
South Windsor	$13,643.02	$29,046.50	$42,689.52	$10,672.38	4	1	1-N
Vernon	$41,230.09	$51,502.19	$92,732.28	$8,430.21	11	4	2-R, 2-N
West Hartford	$542,657.27	$169,734.75	$712,392.02	$7,828.48	91	34	34-R
Wethersfield	$25,580.95	$1,794.00	$27,374.95	$3,041.66	9	4	4-R
Windsor	$26,579.85	$5,058.57	$31,638.42	$7,909.61	4	2	2-R
Capitol Region	$2,409,081.92	$1,109,759.32	$3,518,841.24	$12,260.77	287	98	83-R, 15-N

*R = Residential, N = Non-residential, i.e., Commercial

Source: CT DEEP 06/05/12

Map 8: Capitol Region Insurance Claims for Repetitive Flood Losses



Data Source: CT DEEP 05/10/12

Dam Failure

Dams provide vital benefits to our region such as water supply, power generation, flood control, and recreation, but in the event of failure, they can pose a threat to lives and property. Dam failure can happen for a number of reasons including as a result of natural disasters such as structural failure due to earthquakes or overtopping due to heavy precipitation. Dams in Connecticut are regulated by the Department of Energy and Environmental Protection (DEEP). Dams are rated by their hazard potential as outlined in the table below. According to DEEP's *Guidelines for Inspection and Maintenance of Dams*, owners of class B and C dams are required to prepare and implement an emergency operations plan (EOP) which would include an identification of the area inundated by a dam failure; establishment of a procedure for monitoring the dam during heavy rainfall and runoff; and formalizing a warning system to alert local emergency management officials.

Table 13: Dam Hazard Categories

Class C:	**High** hazard potential dam which, if it were to fail, would result in the probable loss of life; major damage to habitable structures, residences, hospitals, convalescent homes, schools, etc.; damage to main highways; or great economic loss.
Class B:	**Significant** hazard potential dam which, if it were to fail, would result in possible loss of life; minor damage to habitable structures, residences, hospitals, convalescent homes, schools, etc.; damage to or interruption of the use or service of utilities; damage to primary roadways and rail- roads; or significant economic loss.
Class BB:	**Moderate** hazard potential dam which, if it were to fail, would result in damage to normally unoccupied storage structures, damage to low volume roadways, or moderate economic loss.
Class A:	**Low** hazard potential dam which, if it were to fail, would result in damage to agricultural land, damage to unimproved roadways, or minimal economic loss.
Class AA:	**Negligible** hazard potential dam which, if it were to fail, would result in no measurable damage to roadways, land and structures, and negligible economic loss.

Source: *Guidelines for Inspection and Maintenance of Dams,* Connecticut Department of Environmental Protection, September 2001, available for download at http://www.ct.gov/deep/cwp/view.asp?a=2720&q=325634&deepNav_GID=1654

According to the DEEP, there are 533 dams in the Capitol Region. The Capitol Region has 38 Class C, or high hazard, dams (see Table 14 below). Failure of a Class C dam would result in probable loss of life, major damage to habitable structures, damage to major highways and great economic loss. The region also has 59 Class B, or significant hazard, dams. Failure in these dams would result in similar, but less severe damage. Following is a list of the high hazard potential dams located within the Capitol Region. The CT DEEP, Metropolitan District Commission (MDC) or municipalities own the majority of these dams, which serve in flood control, or water supply.

Map 9: Dams in the Capitol Region

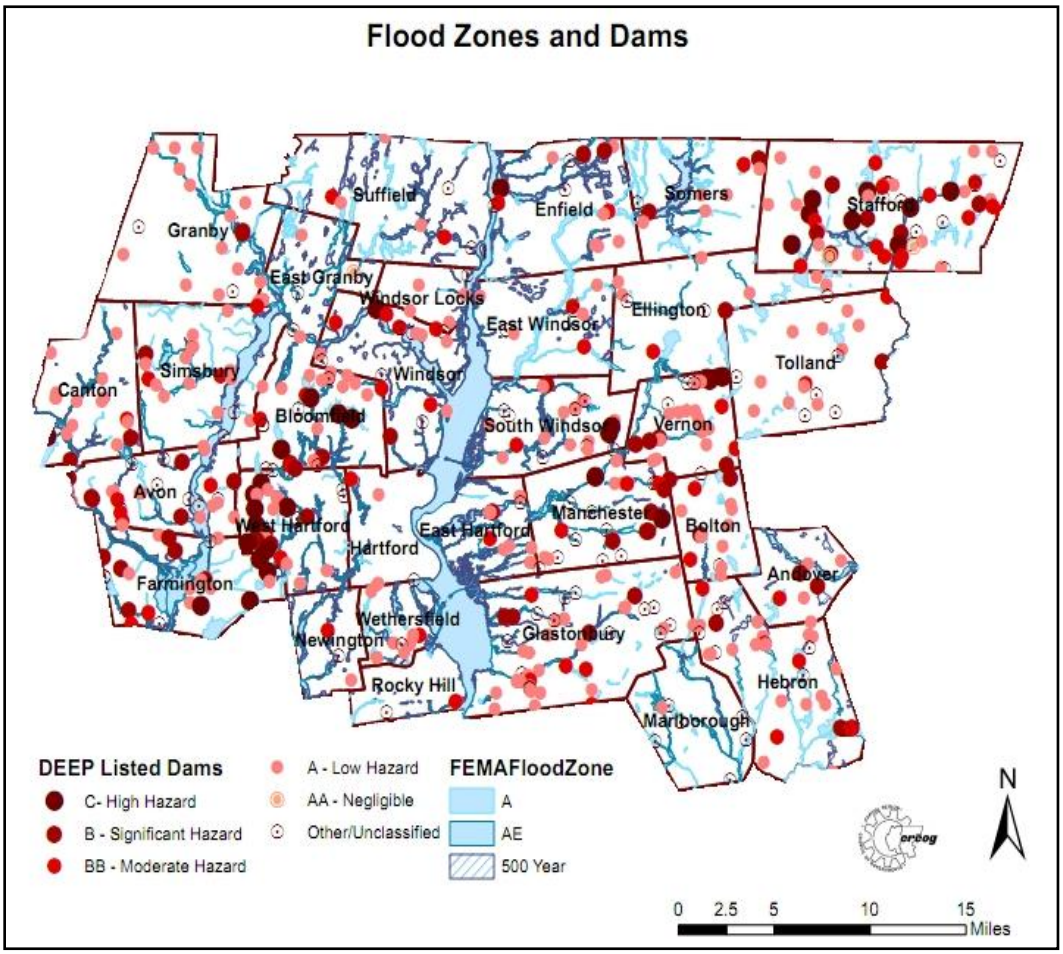


Table 14: Capitol Region High Hazard Dams (Class C)

CT Dam#	Dam Name	Town	Downstream Watercourse	Hazard Class	Owner
1101	BLOOMFIELD DAM (TUNXIS RESERVOIR #3	BLOOMFIELD	WASH BROOK	C	CT DEP
1103	WINTONBURY DAM SITE #1	BLOOMFIELD	BEAMANS BROOK	C	CT DEP
1104	COLD SPRING DAM	BLOOMFIELD	TUMBLE BROOK	C	CT DEP
1105	BLUE HILLS RESERVOIR SITE #2	BLOOMFIELD	BEAMANS BROOK TRIB	C	CT DEP
4902	FRESHWATER POND	ENFIELD	FRESHWATER BROOK	C	TOWN OF ENFIELD
5201	BATTERSON PARK POND DAMS	FARMINGTON	BASS AND CADWELL BROOKS	C	CITY OF HARTFORD
5202	FARMINGTON RESV	FARMINGTON	PEQUABUCK RIVER TRIB	C	TOWN OF FARMINGTON
5211	SOUTH RESERVOIR DAM	FARMINGTON	UNNAMED	C	CT DEP
6407	RIVERFRONT DIKE	HARTFORD	CONNECTICUT RIVER	C	CITY OF HARTFORD-PUBLIC WORKS

6408	NORTH MEADOW DIKE	HARTFORD	CONNECTICUT RIVER	C	CITY OF HARTFORD-PUBLIC WORKS
6409	SOUTH MEADOW DIKE	HARTFORD	CONNECTICUT RIVER	C	CITY OF HARTFORD-PUBLIC WORKS
6410	FOLLY BROOK DIKE	HARTFORD	CONNECTICUT RIVER	C	CITY OF HARTFORD-PUBLIC WORKS
7703	HOWARD RESERVOIR DAM	MANCHESTER	PORTER BROOK	C	MANCHESTER, WATER & SEWER DEPT.
7706	UNION POND DAM	MANCHESTER	HOCKANUM RIVER	C	MANCHESTER, WATER & SEWER DEPT.
13228	AVERY SITE I	SOUTH WINDSOR		C	CT DEP
13229	AVERY SITE #2	SOUTH WINDSOR	AVERY BROOK	C	CT DEP
13401	WHITNEY RESERVOIR SITE #1	STAFFORD	PATTEN BROOK	C	CT DEP
13402	ELLIS RESERVOIR SITE #2	STAFFORD	ELLIS BROOK	C	CT DEP
13403	POMEROY RESERVOIR SITE #3	STAFFORD	MCINTYRES BROOK	C	CT DEP
13405	ELLITHORPE RESERVOIR SITE #5	STAFFORD	MIDDLE RIVER	C	CT DEP
13406	SHENIPSIT RESERVOIR SITE #6	STAFFORD	EDSONBROOK TRIB	C	CT DEP
13408	STAFFORDVILLE RESV	STAFFORD	FURNACE BROOK	C	TOWN OF STAFFORD
13410	WARREN POND	STAFFORD	FURNACE BROOK	C	WARREN CORPORATION
13411	RIVERSIDE POND	STAFFORD	FURNACE BROOK	C	TTM PRINTED CIRCUIT GROUP, INC.
14601	HOCKANUM RESERVOIR	VERNON	HOCKANUM RIVER	C	ANTOINETTE REALTY CO.
14602	SHENIPSIT LAKE	VERNON	HOCKANUM RIVER	C	CONNECTICUT WATER COMPANY
14606	PAPER MILL POND	VERNON	HOCKANUM RIVER	C	AMERBELLE CORP.
15507	HARTFORD RESERVOIR #1	WEST HARTFORD	UNNAMED	C	METROPOLITAN DISTRICT COMMISSION
15508	HARTFORD RESERVOIR #2	WEST HARTFORD	UNNAMED	C	METROPOLITAN DISTRICT COMMISSION
15509	HARTFORD RESERVOIR #3	WEST HARTFORD	UNNAMED	C	METROPOLITAN DISTRICT COMMISSION
15511	HARTFORD RESERVOIR #6	WEST HARTFORD	UMBLE BROOK	C	METROPOLITAN DISTRICT COMMISSSION
15512	BURNT HILL RESERVOIR DAM	WEST HARTFORD	TROUT BROOK	C	CT DEP
15513	TALCOTT RESERVOIR DAM #1	WEST HARTFORD	UNNAMED	C	CT DEP
15514	BUGBEE RESERVOIR	WEST HARTFORD	TROUT BROOK TRIB	C	CT DEP
15523	TALCOTT RESERVOIR DAM #2	WEST HARTFORD	TROUT BROOK TRIB	C	CT DEP
15529	SOUTH RESERVOIR DIKE	WEST HARTFORD		C	
15536	NEW PARK AVENUE FLOOD PREV. DIKE	WEST HARTFORD		C	TOWN OF WEST HARTFORD
16401	RAINBOW RESERVOIR	WINDSOR	FARMINGTON RIVER	C	THE FARMINGTON RIVER POWER CO.

Source: CT DEEP Dam Safety Section, October 2012

According to the *2014 Connecticut Natural Hazard Mitigation Plan Update*:

> The most critical and hazardous dams are required to meet a spillway design standard much higher than passing the runoff from a 100-year rainfall event. Although not all of the dams under DEEP jurisdiction have been shown to be able to withstand the 100-year rainfall event, most of the dams meet this standard due to original design requirements or recent spillway upgrades. For the most part if smaller rainfall events, (e.g. 10-year and 25-year events) occur more frequently there will be little impact on the ability of Connecticut dams to operate safely.

Although, the risk of dam failure may be low, the floods of October 2005 demonstrated the Region's vulnerability to localized storm impacts on dams. Several low and moderate hazard potential dams suffered some impact from localized major flooding. Table 15 below shows a list of dams within the Region that were breached or damaged in October 2005.

Table 15: Capitol Region Dams Impacted by October 2005 Flooding

Location	Dam	Ownership	Dam Class	Impact on Dam
Bloomfield	ABB Pond Dam	Private	unknown	Damaged
Somers	Somerville Pond	DEP	unknown	Partially Breached
East Windsor	Windsorville Dam	Private	BB	Damaged
Enfield	Springborn Dam	DEP	BB	Damaged
Suffield	Cains Pond	Private	A	Fully Breached
	Schwartz Pond Dam	Private	BB	Partially Breached

The draft *2013 Connecticut Natural Hazard Mitigation Plan Update* estimates there are nearly 12,000 people in Hartford County and 4,150 people in Tolland County within the mapped dam inundation areas of high and significant hazard dams. The Capitol Region does not include all municipalities in Hartford and Tolland Counties thus the regional population exposed to this risk is likely lower, probably under two percent.

Severe Winter Storms

Connecticut is subject to blizzards, ice storms and nor'easters - storms characterized by strong, possibly damaging northeasterly winds. The Capitol Region receives an average annual snowfall of about 40", although snowfall amounts vary widely from year to year and can vary dramatically across the Region in any given storm. Severe winter storms can result in damage to buildings and infrastructure, loss of life, and disruptions to regional transportation and communication systems. Half of all federal disaster declarations for Connecticut over the past 20 years have followed major winter or snow storms. Federal assistance is frequently used to offset the snow/ice removal costs the State and municipalities incur. For example, a federal emergency was declared for the February 11-12, 2006 snowstorm in several counties in Connecticut (including Hartford and Tolland) to help share the costs of snow removal. In 2011, FEMA obligated over $74 million in Public Assistance funds to the State of Connecticut to reimburse state agencies, local governments and eligible private nonprofit organizations for costs associated with the January 11-12, 2011 snowstorm and Storm Alfred in October (See Table 4). The frequency, intensity and timing of winter storms dramatically impacts snow removal budgets. Storm Alfred was particularly costly for municipalities because of the heavy debris loads resulting from the

high number of fully leafed trees downed in this storm. Municipalities also incur higher labor costs for snow removal on weekends and holidays.

Notable winter storms such as the blizzards of 1888, 1978, and 2013 delivered nearly an entire season's worth of snow in single events to the Region. The blizzard of 1888, called the Great White Hurricane, occurred on March 11 through 14th. This blizzard produced over 50 inches of snow in some parts of the State and caused over 400 deaths along the East Coast. The blizzard of 1978, which occurred on February 6th, paralyzed the State for three days and resulted in four Connecticut deaths. The blizzard caused widespread damage throughout New England resulting in 99 deaths and $520 million in damages. Ice storm Felix which occurred on December 18, 1973, was Connecticut's most severe ice storm and resulted in two deaths and widespread power outages. Other notable winter storms in Connecticut include nor'easters in 1979, 1983, 1988, 1992, 1996, 2003, October 2011's Storm Alfred, and most recently, the February Blizzard of 2013. Following are descriptions of some of the winter storms that have hit the Region in the last 15 years, and their impacts, from the National Weather Service's Storm Events Database (unless otherwise noted). As is evident from these descriptions, individual winter storm events need not be unusually intense to cause damages and even loss of life.

January 7, 1996: This storm was one of the most significant winter storms to hit southern New England in the past 20 years and was named the "Blizzard of '96" from the Middle Atlantic States to southern New England. However, by National Weather Service definition, no actual blizzard conditions occurred in the state. Snowfall across the north and northeast portions of the state ranged from 15 to 23 inches. In Hartford County, Bradley International Airport recorded 18.2 inches. New Britain had 18 inches and Wethersfield, 15.3 inches. In Tolland County, 22.5 inches were recorded in Mansfield. This storm disrupted transportation systems and closed schools and businesses. A barn roof collapsed in Simsbury within a week or so following this very heavy snowfall.

March 2, 1996: A total of 6 to 7 inches of snow fell across the northern part of the state. There were 391 skidding accidents reported to the state police. Three people were killed and dozens injured on the icy roadways. A number of state highways were closed for a time due to the numerous accidents and very slippery conditions, including Route 30 in Tolland and Route 195 in Mansfield.

December 6, 1996: An intensifying storm system moving eastward from the southeast tip of Long Island caused heavy, wet snow across northern Connecticut. The greatest totals were reported from the higher elevations. Several thousand electric customers lost power, including a total of 1700 in Avon. In Simsbury, a town-owned tobacco barn collapsed under the weight of the snow. The barn was in rough shape to start with, but the collapse amounted to approximately $37,000, according to the Simsbury Assessors' Office. Road conditions became very poor as the snow continued to fall throughout the day.

December 7, 1996: This storm brought heavy, wet snow and resulted in widespread power outages. There had been another heavy, wet snow event the day before, too. A total of 225,000 electric customers lost power statewide, including 100,000 in central Connecticut and 95,000 in the eastern part of the state. Power remained out for several days, despite the efforts of dozens of electric company repair crews, many from out-of-state. Many roads remained unplowed until the utility companies could clear away fallen wires. A firefighter died instantly while on duty in Somers when he came in contact with a 23,000 volt power line that had been knocked down by the heavy snow. Route 44 was closed for 15 hours due to a fallen power line. Up to 22 shelters were opened across the region and many residents left their unheated and darkened homes. Many vehicles and homes were damaged by falling tree limbs and damage was estimated in the millions of dollars.

January 24, 1997: Light freezing rain created very treacherous driving conditions and caused numerous skidding accidents, including many multiple-car accidents. State police at the Tolland barracks reported 60-80 accidents, mostly minor, late Friday night, January 24th. Several bridges had to be closed in the Hartford area when more than a dozen cars collided. Several other highways also were closed in northern Connecticut due to icing conditions. A spotter in Windsor reported 1/4" to 1/3" of ice on trees during the early morning hours on January 25th.

December 20, 1999: Light freezing rain fell in the deeper valleys of northern Connecticut, as rain fell into a shallow layer of below freezing air at the surface. The resultant light coating of ice formed "black ice" on many roadways, which caused many accidents. It was estimated that there were nearly one hundred accidents, mostly fender benders, throughout Hartford, Tolland, and Windham Counties as a result of the slick driving conditions.

November 26, 2000: Low pressure moving north up the mid Atlantic coast brought a period of light freezing rain to much of northern Connecticut. Ice accretion was under one quarter inch, but the freezing rain left black ice on roads, causing dozens of accidents at the end of the Thanksgiving weekend, usually a busy travel day. Temperatures warmed into the 40s by late morning, ending the danger of icing.

February 5, 2001: A major winter storm brought heavy snow and strong winds to northern Connecticut. The highest snowfall totals, between 12 and 24 inches, were reported in Hartford County. Totals of 12 to 18 inches were widely observed in Tolland and Windham Counties. Several minor accidents were attributed to the storm, and traffic in greater Hartford was brought to a standstill during the height of the storm. Several thousand electric customers were left without power.

November 16, 2002: A major ice storm caused significant damage in north central Connecticut. There were numerous reports of downed trees, limbs, and power lines as a result of one-half to three-quarters of an inch of icing. An estimated 100,000 customers in Hartford and Tolland Counties were left without power because of the storm. Damage was especially severe in western Hartford County, where entire communities such as Hartland, Granby, Simsbury, and Canton were left without power for as much as five days. Sections of Canton were completely isolated due to downed trees and wires, according to local police. The damage from the ice storm was compounded by high winds one day later. Gusts as high as 50 mph hampered the cleanup effort, downed more trees and branches which were weighted down by ice. Total damage from the storm in Hartford County was estimated at two million dollars. The damage was less severe in neighboring Tolland County, but there were still many reports of downed trees, limbs, and wires countywide. Total damage was estimated at half a million dollars.

January 8, 2005: Low pressure quickly strengthened as it passed south of New England and brought a mix of snow, sleet and freezing rain to much of interior southern New England. North central Connecticut was especially hard hit by freezing rain, where as much as one half inch of glaze brought down trees, tree limbs and power lines. There was no estimate of how many customers lost power, but dozens of accidents were reported as a result of icy roads.

March 8, 2005: Low pressure strengthened rapidly off the Delaware coast and tracked southeast of New England, bringing heavy snow and high winds to parts of northern Connecticut. Several highways, including Interstate 84, were described by state police as "barely passable" during the height of the storm. In Hartford, downtown streets were jammed with cars as many businesses and state offices closed early. Commuting times were doubled or tripled in many locations.

February 11, 2006: The “Blizzard of 2006” was a n*or'easter* that began on the evening of February 11, 2006. It dumped heavy snow across the northeast United States from Virginia to Maine through the early evening of February 12 and ended in Canada on February 13. Hartford received a total of 21.9 inches of snow — the second largest snowfall since 1906 — and West Hartford received 27 inches of snow. Despite

the large amounts of snow, there were only isolated individual power outages. Bradley International Airport was closed for several hours. While Connecticut was one of the hardest hit areas, the state was well-prepared for the storm and managed to avoid major problems. At the storm's onset, Governor M. Jodi Rell ordered all tractor-trailer trucks off the state's highways to facilitate the efforts of highway crews with snow removal. Connecticut mobilized 2,500 state-owned and privately contracted snowplows to keep state highways open during the storm. The state's 169 cities and towns employed hundreds of additional plows to keep local roads passable.

December 2, 2007: A strong low pressure system moved across southern New England producing wintry precipitation across much of northern Connecticut. Ice accretion downed tree limbs and wires, causing power outages across much of Hartford County.

Winter 2010/2011: Significant snowfalls from December 2010 through February 2011 with only a brief thaws in between allowed snow to pile up across southern New England resulting in numerous roof collapses, towns seeking permission to dump excess snow in area rivers and bays, and numerous disruptions to transportation. The first major snow storm occurred December 26 and 27, 2010, with several other snowfalls following in January. On January 11 and 12, 2011, a developing nor'easter coastal storm dumped up to two and a half feet of snow across Connecticut in a 24 hour period. Twenty-two and a half inches fell at Bradley International Airport setting a one day snowfall record for that location. This was the second major storm of an above average winter of snowfall. Then on January 26, 2011, a strong low pressure system moved up the coast and southeast of Nantucket producing up to a foot and a half of snow across Connecticut. Six to seventeen inches of snow fell across Hartford County and thirteen to nineteen inches fell across Tolland County. Another major storm hit February 1 and 2. Because there was no appreciable melting between storms, roof collapses continued. Federal assistance was sought by Governor Malloy for costs associated with the January 12 winter storm and its cleanup. It was granted by President Obama for Hartford and Tolland Counties. According to the Connecticut Division of Emergency Management and Homeland Security, municipalities and other local and private nonprofit agencies incurred expenses of over $3.15 million due to the heavy snowfalls associated with the federally declared disaster. The municipalities and agencies are eligible for reimbursement of 75% of these costs under FEMA's Public Assistance program.

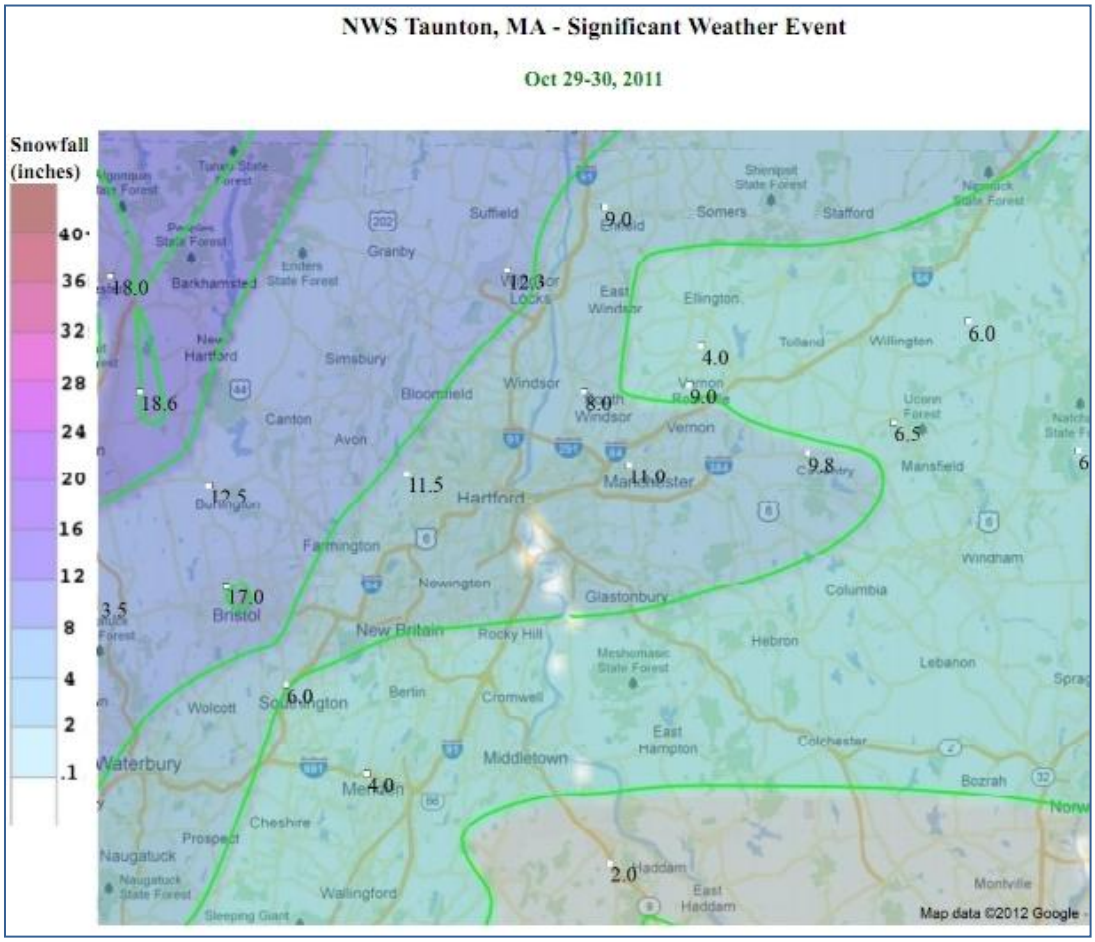
Hebron Building Collapse due to Heavy Snow Loads, February 2, 2011
Credit: John Sholtis, WTNH.com

Storm Alfred, October 29, 2011: A rare and historic October Nor'easter brought very heavy snow to portions of southern New England on Saturday October 29. Low pressure tracked northeast from the North Carolina coast Saturday morning, rapidly strengthening as it passed well south of Nantucket Saturday evening. As the storm intensified, colder air from aloft was drawn into New England resulting in heavy snow in the interior. The precipitation started as mainly snow early Saturday afternoon across the interior of southern New England, although a brief period of rain at the onset was common across the lower elevations. The snow tapered off just after midnight Saturday night in western New England with the last of the precipitation exiting eastern New England Sunday morning. The accumulation of the heavy wet snow on trees and power lines resulted in widespread tree damage and power outages across many communities in central and western Massachusetts, southern New Hampshire, and northeastern Connecticut. Six to seventeen inches of snow fell across Hartford County and six to ten inches of snow fell across Tolland County. Heavy wet snow fell on foliated trees, breaking branches and downing trees and wires, resulting in widespread power outages that lasted for up to 11 days. This resulted in school closures and numerous towns cancelled or rescheduled Halloween and trick-or-treating activities. At the peak, 830,000 customers in Connecticut were without power. Over 250 trees and 106 utility poles were downed in Somers. In addition, 8 transformers were destroyed and 24 were damaged in Tolland County. A motorist died in a traffic accident in Hebron blamed on the road conditions and weather. The Glastonbury Pheasant Farm lost more than 4,000 birds. Throughout Connecticut, 164 AT&T cell phone towers were damaged resulting in degraded cell phone service until towers could be repaired and power restored. Air travel in and around the Hartford area was disrupted when numerous flights were diverted to Bradley International Airport from the New York City metro area and then power outages affected the airport. Several airplanes were not able to allow their passengers to disembark for seven hours or more. The Enfield DMV roof was compromised by the heavy snow and was shutdown. Both Avon and South Windsor estimated 100,000 cubic yards of debris from fallen trees and power lines. According to the Connecticut Division of Emergency Management and Homeland Security, municipalities and other local and private nonprofit agencies incurred expenses of over $68 million due to Alfred. Most of this expense was due to cleanup efforts associated with the enormous amount of debris generated by the storm. The municipalities and agencies are eligible for reimbursement of 75% of these costs under FEMA's Public Assistance program.

Snow Covered Trees and Streets, Glastonbury, October 30, 2011, CRCOG

October 2011 Storm Cleanup in Windsor, FEMA

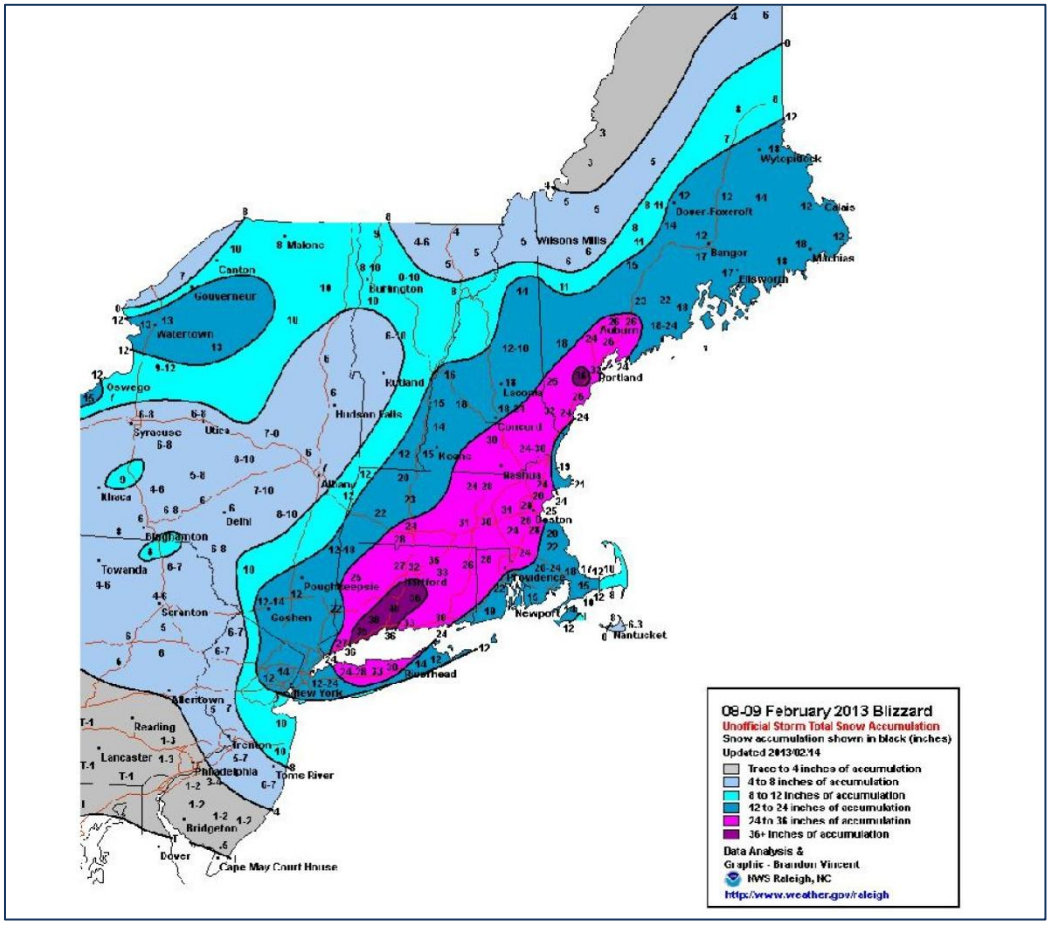
Figure 4: October 2011 Snowfall Totals Across Central Connecticut



Source: National Weather Service.

Blizzard of 2013: A massive nor-easter hit the Northeast February 8th and 9th bringing record amounts of snow to Connecticut and other areas in New England. According to NOAA's National Climatic Data Center (http://www.ncdc.noaa.gov/news/evaluating-february-2013-blizzard-regional-snowfall-index) over 49,000 people across 192 square mile area (including much of Connecticut) saw 30 inches or more of snow as a result of this storm. According to meteorologist Geoff Fox, the National Weather Service reported snow totals in Hartford County which ranged from 20 inches in East Hartford and Enfield to 33.5 inches in Glastonbury, and snow totals in Tolland County, ranging from 25 inches in Vernon to 32.5 inches in Coventry (http://www.geofffox.com/MT/archives/2013/02/09/2013-blizzard-snow-totals-for-connecticut.php). At times snow fell at a rate of 6 inches per hour. The governor closed limited access highways on February 8th and all roads on February 9th. Clean up took days and required cities and the State to bring in additional crews and equipment. According to the Hartford Courant, the Connecticut Department of Transportation brought in 150 additional pay loaders to handle the massive accumulations of snow on the roads. The blizzard was also responsible for several deaths in Connecticut including two in Manchester. (http://articles.courant.com/2013-02-12/news/hc-weather-snow-connecticut-0208-20130205_1_clear-snow-dannel-p-malloy-asylum-avenue). The Connecticut Department of Agriculture reported that more than 300 agricultural structures partially or completely collapsed (www.ct.gov/doag/lib/doag/Feb_27_2013_EMAIL.pdf - 2013-02-26).

Figure 5: Blizzard of 2013 Snowfall Totals



Source: National Oceanic and Atmospheric Administration, National Weather Service, Raleigh, North Carolina, taken from http://en.wikipedia.org/wiki/February_2013_nor%27easter.

Tornadoes/High Winds

Connecticut averages approximately three tornadoes every two years; however, in the first week and a half of July 2013 four tornadoes hit the State including three which touched down in the Capitol Region. Hartford and Litchfield Counties are at the highest risk for tornadoes within the state based on historical patterns and locations of their occurrence. Between 1950 and 2003, Hartford County experienced 14 tornadoes and Tolland County experienced 10. These tornadoes occurred between April and October. Between 2006 and 2012, Connecticut experienced twelve tornados. Two of these were in Hartford County (Wethersfield and Bristol) and one in Tolland County (Somers). The Somers tornado was an EF0 tornado which struck on May 28, 2007 and damaged a barn. The Wethersfield tornado was an EF1 tornado which struck on June 29, 2009 and resulted in $750,000 in property damages but no reported injuries. On July 1, 2013, three tornadoes touched down in Connecticut; two of these were in the Capitol Region: an EF1 which traveled from Windsor Locks to East Windsor and an EF0 which struck Enfield. On July 10, 2013, an EF1 tornado touched down in Andover and traveled over 11 miles passing through Coventry and Mansfield.

One of the country's most destructive tornadoes touched down in Windsor Locks and Windsor on October 3, 1979. The F4 tornado had winds in excess of 200 miles per hour, and tore an 11-mile path from Windsor to Suffield. The tornado killed 3 people, injured 500 and caused an estimated $250 million ($776,385,000 in 2011 dollars) in damage, in part because it struck the New England Air Museum destroying several planes and hangars. The 1979 tornado still ranks as the 9th most costly single tornado in the United States, according to the Storm Prediction Center of the National Oceanic & Atmospheric Administration.

Tornado Damaged Aircraft from New England Air Museum, October 4, 1979.
Credit: John Long, Hartford Courant, http://www.courant.com/business/connecticut-insurance/hrt-hc-aircraft-devasted20120104123803,0,2414026.photo.

New England Air Museum, Windsor Locks, 1979
Credit: New England Air Museum. From the Tornado Page: http://www.neam.org/tornado5.htm

Wethersfield House torn in two by tree toppled during tornado of June 26, 2009. Credit: Wethersfield Historical Society http://www.wethhist.org/articles-from-the-community/2011/01/its-an-ugly-scene-out-there.html

More recently, on June 1, 2011, three tornados touched down in Hampden County, Massachusetts just north of the Connecticut state line. The strongest, an EF3 tornado resulted in 4 deaths, 200 injuries and $227,600,000 in property damage. This tornado first touched down in Westfield and continued on a 39 mile path through West Springfield, Springfield, Wilbraham, Monson, Brimfield and Sturbridge.

High winds and microbursts (strong straight-line downburst winds) can also inflict damage to property and result in injuries. A high wind event on October 29, 2006 with peak gusts of 49 mph. brought down trees and power lines in West Hartford, Andover, Ellington and Tolland. On March 8, 2008, Bradley International Airport recorded a wind gust of 53 mph. In addition, local television meteorologists in Hartford reported wind gusts of 62 mph. Trees and wires were downed in Glastonbury, closing a portion of Route 17. A light pole was downed on Garnett Lane and large tree limbs were downed on Avery Street, both in South Windsor. On February 19, 2011, Bradley International Airport recorded a sustained wind of 44 mph. Multiple trees were downed across Hartford County, including one that was downed onto a garage on Halwood Drive in Granby, another on a garage in East Hartford, and two on April Drive and Indian Hill Road in Glastonbury.

According to the Hartford Courant, on August 12, 2012, a microburst with winds up to 100 mph hit an area of Glastonbury one-half-mile wide and 2.5-miles long bringing down trees and damaging property. Based on the damage, the National Weather Service determined the microburst had wind speeds of 85 to 100 mph in the Butler Drive and Needletree Lane area, and 75 to 90 mph around Homestead Drive and Paddok Street. Outside of those areas, the storm brought wind speeds

ranging from 55-to-80 mph. The National Weather Service explained that for the area it affected, the microburst was as powerful as a category 2 hurricane, which is characterized by wind speeds of 96 to 100 mph. The microburst resulted from a violent storm which formed on a warm front to the south and moved into central Connecticut. While Glastonbury appeared to be the hardest hit, other parts of the state saw flash flooding and wind-related damage. About 17,000 homes and businesses powered by Connecticut Light & Power were without electricity as a result of the storm.

The most recent tornado activity in the region occurred on July 1 and July 10, 2013. According to the National Weather Service in Taunton, Massachusetts, an EF1 tornado with an estimated maximum wind speed of 86 miles per hour traveled 2.5 miles from Windsor Locks, crossed the Connecticut River and ended in East Windsor. The tornado which was estimated to be about 200 yards wide hit between 1:30 pm and 1:35 pm. Various news outlets reported that the tornado traveled through tobacco fields, flattening the crops and tearing netting off the crops and sending it onto trees, roofs and I-91. The tornado also knocked down a sports center bubble dome. Young campers at the center sought shelter in an adjacent building before the tornado struck. There were no injuries reported. Minutes later an EF0 tornado, with maximum wind speed of 65 mph, hit Enfield knocking down trees and fencing. On July 10th, a tornado touched down in Andover about 5:20 pm and traveled eastward for over 30 minutes through Coventry and Mansfield. The tornado had maximum wind speeds of 90 miles per hour and was up to 100 yards wide. The same storm system caused a microburst which hit Tolland toppling numerous large trees.

The July 1, 2013 Tornado Credit: http://wjar.images.worldnow.com/images/22735124_BG1.jpg

Sports Dome Damage from July 1, 2013 Tornado in East Windsor.
Credit: John Woike, Hartford Courant. http://articles.courant.com/2013-07-01/news/hc- tornado- warning-0702-20130701_1_windsor-locks-tornado-rips-ef1

Enhanced F Scale for Tornado Damage

FUJITA SCALE			DERIVED EF SCALE		OPERATIONAL EF SCALE	
F Number	Fastest 1/4-mile (mph)	3 Second Gust (mph)	EF Number	3 Second Gust (mph)	**EF Number**	**3 Second Gust (mph)**
0	40-72	45-78	0	65-85	**0**	**65-85**
1	73-112	79-117	1	86-109	**1**	**86-110**
2	113-157	118-161	2	110-137	**2**	**111-135**
3	158-207	162-209	3	138-167	**3**	**136-165**
4	208-260	210-261	4	168-199	**4**	**166-200**
5	261-318	262-317	5	200-234	**5**	**Over 200**

IMPORTANT NOTE ABOUT ENHANCED F-SCALE WINDS: *The Enhanced F-scale still is a set of wind estimates (not measurements) based on damage judgments.* **Source:** http://www.spc.noaa.gov/efscale/ef-scale.html

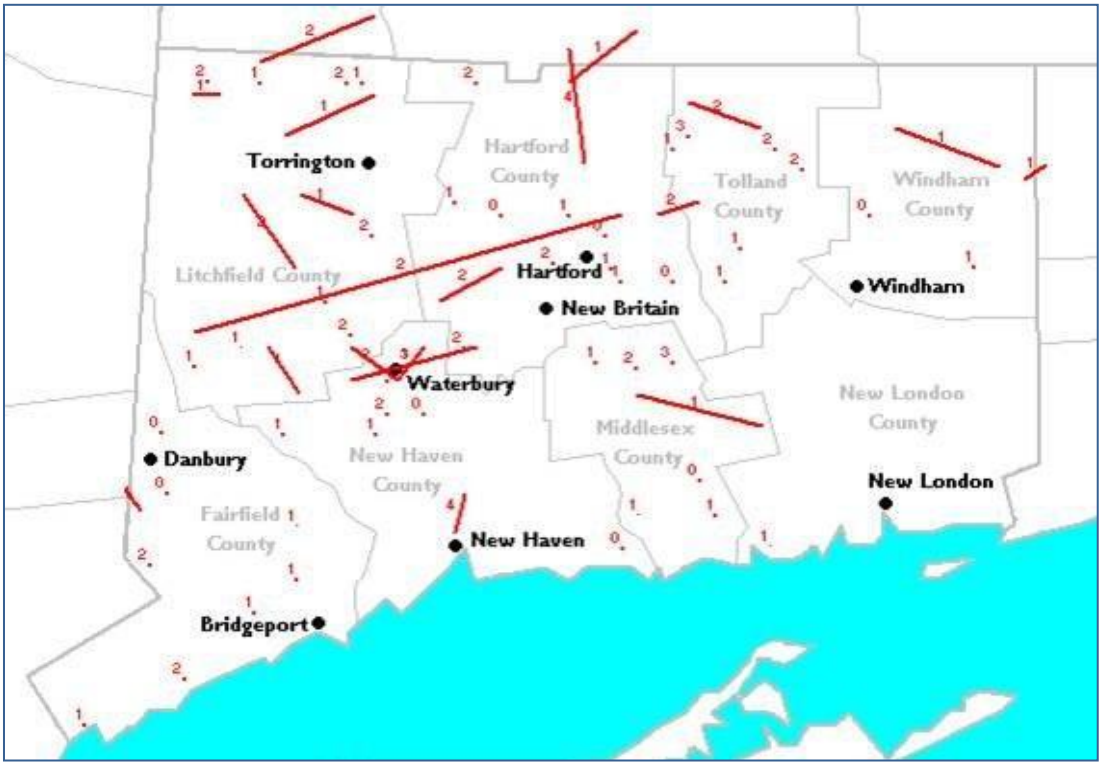
Table 16 displays a list of the tornadoes that occurred in Hartford and Tolland Counties from 1950 to 1995. The majority of tornadoes that touchdown in the Capitol Region are of a lesser intensity; however, the 1979 Windsor Locks tornado illustrates that the Region is vulnerable to tornadoes as strong as those that occur in the Midwest.

Table 16: Tornadoes in Hartford and Tolland Counties 1950-1995

Location of Touchdown	Hour	# Dead	# Injured	F Scale
Hartford County				
August 21, 1951	1715	0	9	F2
May 10, 1954	1255	0	0	F2
October 24, 1955	1735	0	0	F1
June 19, 1957	1500	0	0	F1
May 30, 1959	1530	0	0	F1
May 24, 1962	1700	0	5	F3
October 3, 1970	1700	0	1	F1
June 28, 1973	1345	0	1	F1
August 31, 1973	1730	0	0	F2
September 6, 1973	1000	0	0	F2
October 3, 1979	1400	3	500	F4
July 5, 1984	1657	0	0	F2
August 4, 1992	1505	0	0	F0
June 29, 1994	1416	0	0	F0
Tolland County				
August 20, 1951	1630	0	0	F2
May 10, 1954	930	0	2	F3
August 8, 1956	1630	0	0	F0
September 7, 1958	1610	0	2	F2
April 26, 1961	1115	0	0	F1
August 19, 1965	1705	0	0	F2
August 17, 1968	1800	0	0	F1
September 18, 1973	1208	0	0	F1

Source: The Tornado Project, www.tornadoproject.com

Figure 6: Tornado Tracks Across Connecticut



Approximate tracks of all tornadoes which affected Connecticut between 1950 and 1999, plotted with Fujita scale rankings. Derived from an image created using SeverePlot, free software maintained by John Hart, lead forecaster for the Storm Prediction Center.1950 to 1999 Tornado tracks. Source: Wikimedia

Earthquakes

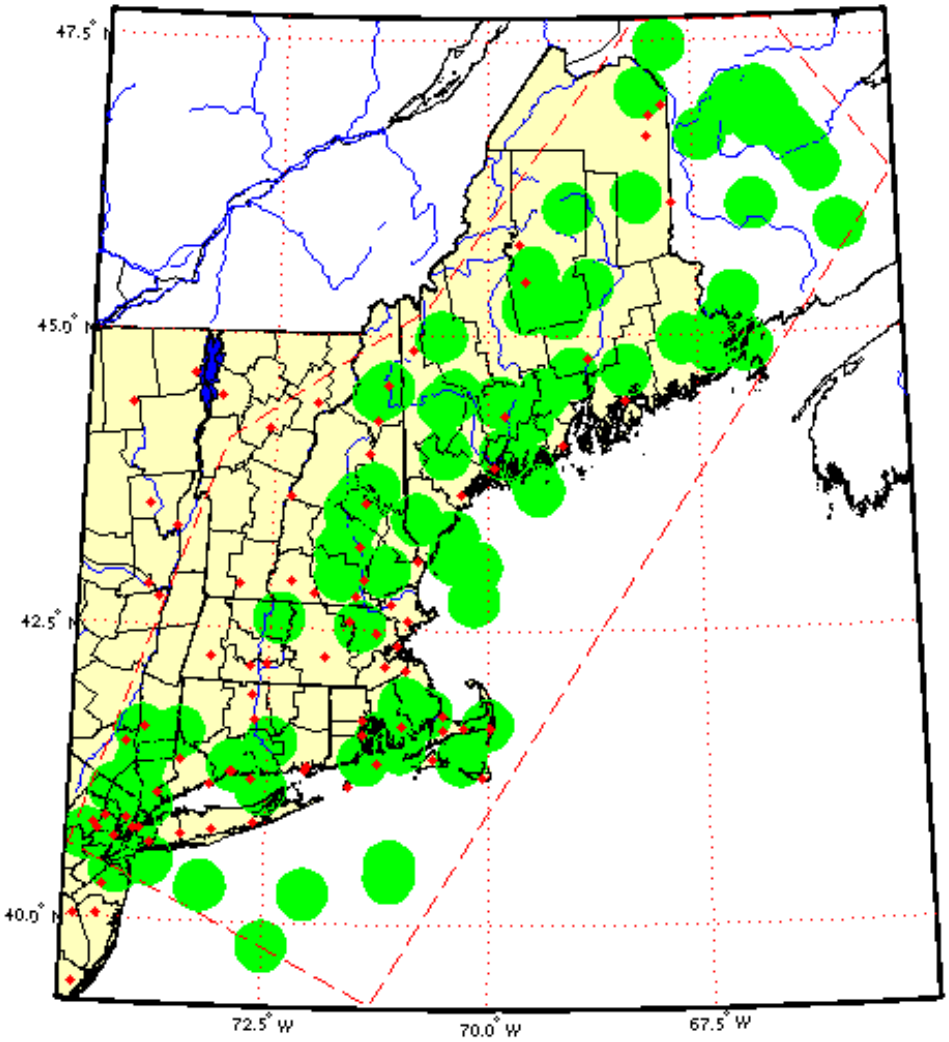
Connecticut has a moderate risk of earthquakes based on the frequency of their occurrence, not the intensity of individual earthquakes. Between 1568 and 1989, the state had 137 recorded earthquakes. According to records kept by Weston Observatory, between 1837 and 2012, sixteen earthquakes were recorded in the Capitol Region. These were centered in Hartford or East of the River. Of those where the magnitude was known, all were under magnitude 4.0. A strong earthquake centered in central Connecticut and thought to be 3.8 magnitude occurred on August 9, 1840. On August 23, 2011, a 5.8 magnitude earthquake struck 3.7 miles below the surface near Mineral, Virginia and was felt in the Capitol Region and beyond. A 4.0 magnitude earthquake centered near Portland, Maine hit on October 16, 2012 and was felt by some in Connecticut.

Earthquakes in Connecticut are intra-plate or intra-tectonic, as opposed to occurring at fault lines. In these types of earthquakes, soil composition determines the magnitude of the impact. Soft soils and filled wetlands conduct energy better than bedrock. A magnitude 5.1 earthquake near Plattsburgh, New York in April 2002 was felt in Hartford and lower-lying areas in western Connecticut because of ground-motion amplification resulting from the soft soils located in these

areas. Many of the strongest earthquakes felt in Connecticut had epicenters in upstate New York, New Hampshire and Massachusetts.

Magnitude 3.0 to 3.9 earthquakes are often felt by people up to a hundred miles away from the epicenter but rarely cause damage. Magnitude 4.0 to 4.9 earthquakes cause shaking of objects indoors but generally cause none to slight damage. Magnitude 5.0 to 5.9 earthquakes can cause moderate to major damage to poorly constructed buildings but none to slight damage to other buildings. Connecticut incorporated building codes for seismic activity into the state building code in 1992. There were no requirements prior to that. So, while the risk for a very damaging earthquake is relatively low in the region, some structures may be impacted by less intense earthquakes depending on the soil and integrity of the structure.

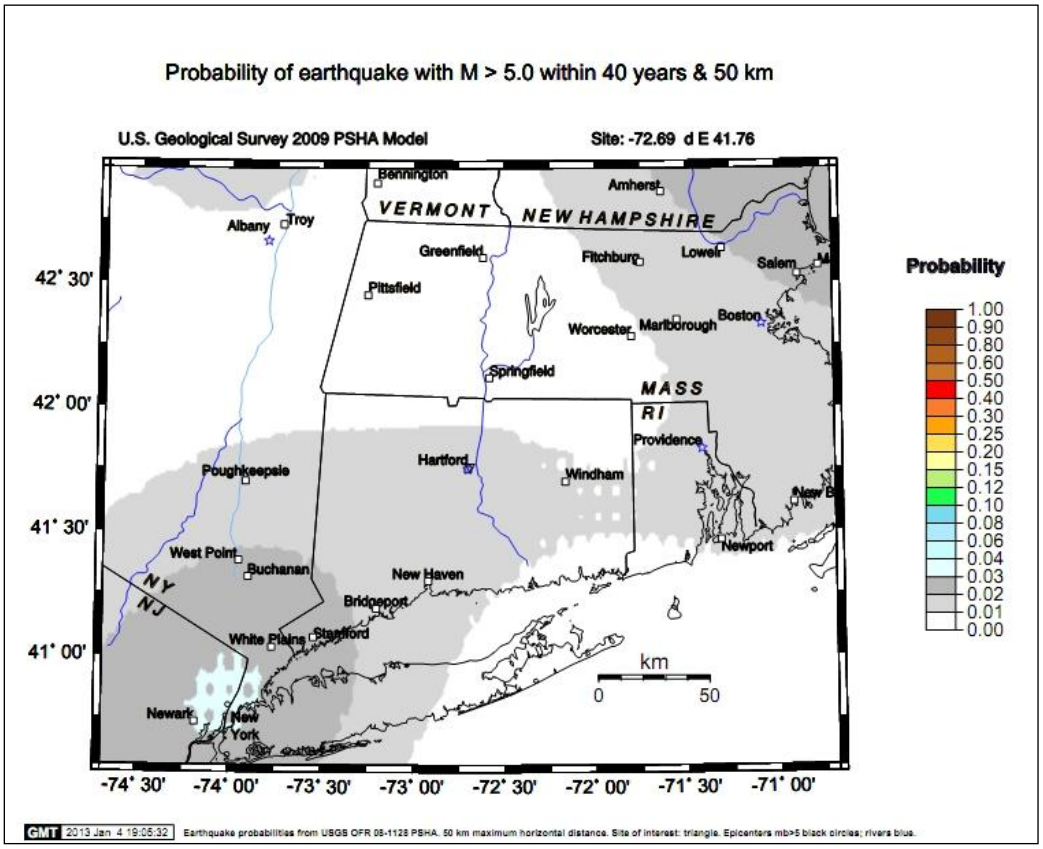
Figure 7: Earthquake Probabilities in New England



This map, produced by Boston College's Weston Observatory, shows in green the areas in which there is a 66 percent chance that the next earthquake of magnitude 2.7 or greater will occur in New England.
Source: Weston Observatory, http://www.bc.edu/research/westonobservatory/northeast/eqprobability.html

The map below, generated using a USGS earthquake probability mapping program, shows that there is a slight probability (between 0.01 and 0.02) that a magnitude 5.0 earthquake will strike the Capitol Region in the next 40 years.

Figure 8: Magnitude 5.0 Earthquake Probability Map



Source: USGS Geologic Hazards Science Center, https://geohazards.usgs.gov/eqprob/2009/index.php

Using FEMA's Hazus-MH software, CRCOG analyzed several earthquake scenarios to estimate the potential loss to property and life. (Copies of these Hazus-MH Earthquake Event Reports are included in the Appendix.) Several scenarios based on historic earthquakes were run. One scenario run was based on a 1998 5.2 magnitude earthquake centered in Pennsylvania and the results were typical for the modeling of historic earthquakes: No buildings or transportation and utility infrastructure were estimated to be damaged as a result of such an earthquake here. No fires were expected to result and no debris was expected to be generated as a result of the earthquake. Also, no injuries, deaths or displacements were expected to result from the quake. There were no economic losses estimated from such an earthquake scenario here.

We also ran a simulation of a magnitude 5.0 earthquake with an epicenter in Hartford. Such an earthquake would be stronger than we would expect based on historical evidence and has a low probability of occurring. (Hazus-MH does not allow modeling of less intense earthquakes.) An

earthquake of this magnitude, however, would inflict considerable damage on the Capitol Region. Hazus estimates that over 12% of the buildings in the region or about 30,700 buildings would be at least moderately damaged and nearly 1000 buildings would be damaged beyond repair. Four hospitals, 89 schools, seven police stations, five fire stations and two emergency operations centers would suffer at least moderate damage although none would be completely damaged. Thirty bridges would be expected to be moderately damaged and one completely damaged. Numerous leaks and breaks in water, wastewater and natural gas lines would be expected. Power outages would be widespread. Four fires are estimated to be ignited due to the earthquake resulting in about $3 million in building losses. Over 4,000 people are likely to seek temporary shelter in public shelters. Depending on the time of day that the earthquake struck, 40 to 85 deaths could be expected. Thousands of people would sustain minor injuries and hundreds would need hospitalization. Total economic losses estimated for the earthquake would be $6.57 billion. Total building related losses were estimated at $5.51 billion with 47% of these losses attributed to residential properties.

If a 5.0 magnitude earthquake were centered in Moodus, an area of historic "rumblings," the effects on the Capitol Region would be considerably less severe. We ran a Hazus simulation of such an earthquake and found that only 1% of the buildings in the Capitol Region or about 2,200 buildings would be at least moderately damaged. Nearly 15 buildings would be damaged beyond repair. No hospitals, schools, police stations, fire stations, emergency operations centers or bridges would suffer at least moderate damage and none would be completely damaged. Some leaks and breaks in water, wastewater and natural gas lines would be expected but no power outages would be expected. Only one fire is estimated to be ignited due to the earthquake. About 100 people would be likely to seek temporary shelter in public shelters. One death would be expected. About 40 people would sustain minor injuries and only a few would need hospitalization. Total economic losses estimated for the earthquake would be about $300 million. Total building related losses were estimated at $272 million with over 55% of these losses attributed to residential properties.

These simulations highlight the significance of the location of the epicenter to the damages that could be expected. A moderately strong earthquake centered near a more populated, built up area would be expected to result in considerably more damage than one located in a more remote area. Based on our history and geology, overall, the Capitol Region's vulnerability to damaging earthquakes is low. The damages we are likely to face here from earthquakes are much lower than in other parts of the nation and world.

Connecticut: Earthquake History

According to the USGS, the lack of historical and instrumental reports of strong earthquakes in Connecticut suggests that the State is a region of very minor seismic activity, even when compared to other States in the northeast region. Connecticut has, however, a history of earthquakes. The cause of earth noises or "rumblings" in the area near Moodus, a few miles north of East Haddam, have been a matter of scientific speculation for years. Native Indians called East Haddam *Morehemoodus*, or place of noises, and the town name "Moodus" derived from the Indian word.

The most severe earthquake in Connecticut's history occurred at East Haddam on May 16, 1791. Describing that earthquake an observer said: "It began at 8 o'clock p.m., with two very heavy shocks in quick succession. The first was the most powerful; the earth appeared to undergo very violent convulsions. The stone walls were thrown down, chimneys were untopped, doors which were latched were thrown open, and a fissure in the ground of several rods in extent was afterwards discovered. Thirty lighter ones followed in a short time and upwards of one hundred were counted in the course of the night."

Historical records show the next moderate tremor occurred at Hartford in April 1837. "It jarred loose articles, set lamps swinging, and rang bells. Alarmed residents rushed from their homes into the streets." In August 1840, an earthquake of similar intensity centered apparently 10 to 20 miles north of New Haven shook Hartford strongly, and was felt at many points in Connecticut. No damage resulted, however. At Chester, not far from East Haddam, observers compared the tremor "to the rumble of thunder."

The strongest tremor since that in 1791 hit near Hartford on November 14, 1925, at about 8 a.m. Plaster was knocked from walls, and many residents were frightened. At Windham, dishes were shaken from shelves, and at East Haddam, the familiar "Moodus" rumblings were noted. More recently, in March 1953, Stamford sustained a minor tremor that alarmed many. "Radiators beat a weird tattoo against the floor of the police station," notes one report. Houses were jarred, and earth noises were heard. The tremor caused no damage. An intensity V earthquake in southern Connecticut occurred on November 3, 1968, at about 3:30 in the morning. Plaster cracked at Madison, furniture shifter at Chester, and small items fell and broke. Loud earth noises accompanied the tremor. The Moodus noises were noted once again at East Haddam.

A few damaging shocks centered in neighboring states, and several Canadian tremors, have been felt in Connecticut over the past three hundred years. A devastating earthquake near Tros-Rivieres (Three Rivers), Quebec, on February 5, 1663, caused moderate effects in some areas of Connecticut. Massachusetts quakes in November 1727 and November 1755 were felt strongly by some in Connecticut. Both resulted in collapsed walls, toppled chimneys, and other damage common to most strong earthquakes at their epicenters.

The Timiskaming, Ontario, earthquake in November 1935 was quite noticeable in Connecticut and other New England States. Several cracked windowpanes were noted at Cornwall, Connecticut. Because of the sparse population, damage at the epicenter of this tremor was insignificant. However, an indication of its severity was the large felt area - one million square miles of Canada and the United States. An earthquake near Massena, New York, in September 1944 was also felt over a wide region. Mild effects were noticed by residents of Hartford, Marion, New Haven and Meriden, Connecticut. At its epicenter, the shock destroyed nearly all chimneys, crippled several buildings, and caused $2 million property damage in that region.

Source: Abridged from Earthquake Information Bulletin, January - February 1971. Taken from USGS Earthquakes Hazards Program website: http://earthquake.usgs.gov/earthquakes/states/connecticut/history.php

Drought

According to the American Planning Association, since 1980, drought has been the fourth most common type of disaster in the United States but is the second most costly overall and per incident. Much of the United States was in the midst of a severe and persistent drought in 2012. This drought affected almost 40% of the country's agricultural land and nearly a third of all farms. Although the eastern seaboard did not experience severe drought conditions in 2012, the impacts are likely to be felt nationwide. One expected consequence of the 2012 drought is an increase in the cost of food: 2013 prices are expected to rise by 2 to 4.5% for a variety of food products.

Droughts periodically occur in Connecticut and can have serious consequences. While a drought does not pose immediate threats to life and property, it can have severe economic, environmental and social consequences. A lack of precipitation can affect not only agricultural production, but also tourism, water utilities, residential wells, businesses and more. See the following pages for a checklist of potential consequences from the National Drought Mitigation Center.

Scientists have classified types of droughts: meteorological, hydrological and agricultural. Meteorological droughts are periods in which precipitation is below normal. In hydrological droughts, deficient precipitation, usually over a period of months, causes surface and subsurface waters to be low. It can take months to recover from hydrological droughts. Agricultural droughts occur during the growing season, when there is insufficient precipitation to support crop production. The region can recover from an agricultural drought more quickly than from a hydrological drought; however, an agricultural drought can result in significant economic losses for the agricultural community. Finally, a lack of precipitation is the primary cause for any drought; however, land use also influences the severity and timing of droughts. Areas with vast impervious-surface coverage inhibit groundwater recharge and can therefore hasten the on-set of a hydrological drought or increase its intensity.

Connecticut experienced notable droughts in 1957, 1964-67, 1980-81 and 2002. During the 2002 drought, several water utilities imposed mandatory water conservation and restriction measures on their customers, while most other companies imposed voluntary restrictions. Such restrictions can impact businesses as well as residences. The state responded to the 2002 drought by developing a drought management plan, which established monitoring and assessment protocols. (See the Drought Matrix below.) During the height of this drought, some municipalities conducted public outreach and education regarding water conservation.

A meteorological drought was most recently declared for Hartford, Tolland and Windham Counties from April 12 through April 24, 2012 due to precipitation levels that were approximately half of normal levels. According to the NOAA Storm Events Database, rivers and streams were most affected as most ran at record low levels during the spring run-off season. The State did not issue a drought declaration, however, as reservoirs were at normal levels, thanks largely to above normal precipitation falling between August 2011 and November 2011. The main impact of this meteorological drought was periods of very high fire danger. In addition, small pond levels were reduced. While soil moisture was well below normal, this drought occurred prior to the beginning of the growing season. Thus, no agricultural impacts were realized.

Figure 9: Connecticut Drought Matrix

					Palmer Drought Index		
	Precipitation	Groundwater	Streamflow	Reservoirs	Severity	Crop Moisture	Fire Danger
ADVISORY	2 months (cumulative) below %65 of normal	3 consecutive months below normal *	2 out of 3 months below normal *	Average levels less than 80% of normal	-2.0 to -2.99	-1.0 to –1.99 abnormally dry,	Moderate
WATCH	3 months cumulative below 65% of normal	4 consecutive months below normal *	4 out of 5 months below normal *	Average levels less than 70% of normal	-3.0 to -3.99	-2.0 to –2.99 excessively dry	High
WARNING	More than 4months cumulative below 65% of normal,	4 consecutive months below normal *	6 out of 7 months below normal *	Average levels less than 60% of normal.	-4 or less	-3 or less	Very high
EMERGENCY	More than 6 months cumulative below 65% of normal	8 consecutive months below normal *	7 months below normal *	Average levels less than 50% of normal or less than 50 days of supply	-4 or less.	-3 or less, severely dry	Extreme

* Normal levels for Groundwater and Streamflow are defined as the 25th percentile of the period of record.

Source: State of Connecticut Interagency Drought Work Group, www.ct.gov/waterstatus/cwp/view.asp?a=3238&q=397062

Rainfall in the first half of 2013 has been higher than normal and drought seems unlikely for the near future. However, as the State's draft Natural Hazards Mitigation Plan Update notes, predicting the future occurrences of drought within any given time period is difficult. As pointed out in the State draft plan, climate change acts to amplify natural hazards and extreme weather events have become more frequent over the past half century. Climate change can bring more intense heat waves which may result in more droughts. Drought remains a potential natural hazard for the Capitol Region. Also, as the State draft plan notes, because human actions can increase the risk of water shortages without any change in meteorological conditions, efforts to conserve water and reduce runoff can protect our water resources even in non-drought periods.

Checklist of Potential Drought Impacts

Economic:

Costs and losses to agricultural and livestock producers—

- Annual and perennial crop losses
- Damage to crop quality
- Income loss for farmers due to reduced crop yields
- Reduced productivity of cropland (wind erosion, long-term loss of organic matter, etc.)
- Insect infestation
- Plant disease
- Wildlife damage to crops
- Increased irrigation costs
- Cost of new or supplemental water resource development (wells, dams, pipelines)
- Reduced milk production
- Forced reduction of foundation stock
- High cost/unavailability of water and/or feed for livestock
- Increased feed transportation costs
- High livestock mortality rates
- Disruption of reproduction cycles (delayed breeding, more miscarriages)
- Decreased stock weights

Loss from timber production—

- Wildland fires
- Tree disease
- Insect infestation
- Impaired productivity of forest land
- Direct loss of trees, especially young ones

Loss from fishery production—

- Damage to fish habitat
- Loss of fish and other aquatic organisms due to decreased flows

General economic effects—

- Decreased land prices
- Loss to industries directly dependent on agricultural production
- Unemployment from drought-related declines in production
- Strain on financial institutions (foreclosures, more credit risk, capital shortfalls)
- Revenue losses to federal, state, and local governments (from reduced tax base)
- Reduction of economic development
- Fewer agricultural producers (due to bankruptcies, new occupations)
- Rural population loss

Loss to recreation and tourism industry—

- Loss to manufacturers and sellers of recreational equipment
- Losses related to curtailed activities: hunting and fishing, bird watching, boating, etc.

Energy-related effects—

- Increased energy demand and reduced supply because of drought-related power curtailments
- Costs to energy industry and consumers associated with substituting more expensive fuels (oil) for hydroelectric power

Water suppliers—

- Revenue shortfalls and/or windfall profits
- Cost of water transport or transfer
- Cost of new or supplemental water resource development

Transportation industry—

- Loss from impaired navigability of streams, rivers, and canals

Decline in food production/disrupted food supply—

- Increase in food prices
- Increased importation of food (higher costs)

Checklist of Potential Drought Impacts

Environmental:

Damage to animal species—

- Reduction and degradation of fish and wildlife habitat
- Lack of feed and drinking water
- Greater mortality due to increased contact with agricultural producers, as animals seek food from farms and producers are less tolerant of the intrusion
- Disease
- Increased vulnerability to predation (from species concentrated near water)
- Migration and concentration (loss of wildlife in some areas and too many wildlife in other areas)
- Increased stress to endangered species
- Loss of biodiversity

Hydrological effects—

- Lower water levels in reservoirs, lakes, and ponds
- Reduced flow from springs
- Reduced stream flow
- Loss of wetlands
- Estuarine impacts (e.g., changes in salinity levels)
- Increased groundwater depletion, land subsidence, reduced recharge
- Water quality effects (salt concentration, increased water temperature, pH, dissolved oxygen, turbidity)

Damage to plant communities—

- Loss of biodiversity
- Loss of trees from urban landscapes, shelterbelts, wooded conservation areas
- Increased number and severity of fires
- Wind and water erosion of soils, reduced soil quality
- Air quality effects (e.g., dust, pollutants)
- Visual and landscape quality (e.g., dust, vegetative cover, etc.)

Social:

Health—

- Mental and physical stress (e.g., anxiety, depression, loss of security, domestic violence)
- Health-related low-flow problems (e.g., cross-connection contamination, diminished sewage flows, increased pollutant concentrations, reduced fire fighting capability, etc.)
- Reductions in nutrition (e.g., high-cost food limitations, stress-related dietary deficiencies)
- Loss of human life (e.g., from heat stress, suicides)
- Public safety from forest and wild land fires
- Increased respiratory ailments
- Increased disease caused by wildlife concentrations

Increased conflicts—

- Water user conflicts
- Political conflicts
- Management conflicts
- Other social conflicts (e.g., scientific, media-based)

Reduced quality of life, changes in lifestyle—

- Population migrations (rural to urban areas, migrants into the United States)
- Loss of aesthetic values
- Disruption of cultural belief systems (e.g., religious and scientific views of natural hazards)
- Reevaluation of social values (e.g., priorities, needs, rights)
- Public dissatisfaction with government drought response
- Perceptions of inequity in relief, possibly related to socioeconomic status, ethnicity, age, gender, seniority
- Loss of cultural sites
- Increased data/information needs, coordination of dissemination activities
- Recognition of institutional restraints on water use

Source: National Drought Mitigation Center, University of Nebraska-Lincoln, www.drought.unl.edu/portals/0/docs/checklist.pdf

Forest and Wildland Fires

Forest fires can cause not only long-term damage to vegetation and ecosystems, but also damage to developments, especially as residential development has increased in woodland areas. The Connecticut Department of Energy and Environmental Protection Division of Forestry issues forest fire danger ratings. The ratings are: low, moderate, high, very high and extreme. These are based on an index of how quickly a fire is likely to spread and measures of drought. In addition, the National Weather Service issues "Red Flag" warnings. A Red Flag warning means that if a fire occurs, firefighters can expect it to behave erratically due to weather conditions.

There are three fire seasons in Connecticut. The spring season runs from mid-March to mid-May. Prior to leaf-out, fuels such as grasses, dead leaves, branches and twigs on the forest floor, are heated and dried out by the sun. These fuels cause spring fires to tend to spread quickly, though they tend to cause little, long-term damage to the forest. The summer fire season lasts from mid-May through September and is largely dependent on precipitation, or lack thereof. Summer fires tend to spread less quickly than spring fires because they burn deeper into the ground. However, the burning of organic material in the soil makes summer fires more difficult to suppress. Summer fires are the most destructive to vegetation. Consequently, erosion usually follows summer forest fires. The fall fire season runs from October through the first snowfall. Fall fires can spread rapidly because of drying leaves that have fallen.

In the last twenty years, a few forest fires have occurred in the Capitol Region. Throughout Connecticut, 1999 was a particularly busy fire year because of drought conditions. According to the DEEP, in an average year, forest fires burn approximately 1,000 acres of woodlands in the State. The State's 2013 draft Natural Hazard Mitigation Plan Update notes that the worst year for wildland fires in the past decade was 2012 when 577 separate fire events occurred throughout the State. Following are descriptions of major forest fires within the Region, as reported in the *Hartford Courant*.

May 1995: A forest fire burned nearly 40 acres on a ridge near the Sweetheart Lake area of Tolland. Officials believed the fire was started accidentally. Unusually dry conditions contributed to the fire's spread. Approximately 50 firefighters from seven departments laid nearly 2,000 feet of hose to contain the fire at its perimeter.

April 1999: A brush fire in the Talcotville section of Vernon burned about 40 acres. Eight fire departments battled the blaze, hauling water in tanker trucks. The fire came within 100 feet of houses in a nearby neighborhood.

April 2005: A fire burned about eight acres near the Farmington River in Avon. About 30 firefighters from five departments put the fire out. The DEP (predecessor of DEEP) Division of Forestry reported a "high" forest fire danger level for that day.

Hazards Summary

The outline below summarizes the risks faced throughout the Capitol Region to the eight natural hazards evaluated in this plan update. The frequencies, potential impacts, vulnerable locations and likely economic losses of each natural hazard are presented. Following this outline is Table 17 which summarizes the vulnerabilities and key issues concerning these natural hazards each of the thirty communities of the Capitol Region face. Table 17 summarizes the concerns local officials identified during the plan update process relating to the impacts natural hazards have on the critical facilities, vulnerable locations and populations, and cultural assets of their communities.

Dam Failure

Frequency:	The likelihood of dam failure is greatest in conjunction with floods, hurricanes and earthquakes.
Potential Impacts:	Bodily harm and loss of life and property. A water shortage may occur if a dam failure impacts an active reservoir.
Vulnerable Locations:	Stream reaches below dams.
Economic Loss:	Repair and replacement costs, business disruption, debris removal and clean-up costs.

Drought

Frequency:	A drought occurs about once every seven years or has a 14% chance of occurrence in any given year.
Potential Impacts:	Water shortages, environmental and human health issues, and increased risk of wildfires, especially in low-density, forested areas.
Vulnerable Locations:	Entire region.
Economic Loss:	Agricultural and water-dependent businesses may experience losses.

Earthquake

Frequency:	A magnitude four or higher earthquake is likely to occur approximately once every 25 years, or a 4% chance of occurrence in any given year.

Potential Impacts:	Minimal property and content damage.
Vulnerable Locations:	Entire region.
Economic Loss:	Repair and replacement costs.

Floods

Frequency:	Major flooding of small rivers and loss of life can be expected every 5-10 years throughout the State. Major flooding of larger rivers, such as the Connecticut and Farmington, with loss of life and structural damage can be expected once every 30 years.
Potential Impacts:	Breached dams, street closures, power outages, utility damage, property and content damage, basement flooding, bodily harm and death.
Vulnerable Locations:	Flood prone and poorly drained areas.
Economic Loss:	Repair and replacement costs, business disruption, debris removal and clean-up costs.

Forest and Wildland Fires

Frequency:	Very low likelihood.
Potential Impacts:	Property and content damage, bodily harm and death.
Vulnerable Locations:	At the woodland/suburban interface.
Economic Loss:	Repair and replacement costs, business disruption, debris removal and clean-up costs.

Hurricanes and Tropical Storms

Frequency:	A moderate category II hurricane can be expected to hit the State once every ten years. A major category III or IV hurricane may hit before 2040, based on 20th century trends. Hurricanes are often downgraded to Tropical Storm status by the time they reach inland Connecticut.

Potential Impacts:	Street closures, power outages, tree damage, utilities damage, property and content damage, bodily harm and death.
Vulnerable Locations:	Entire region but especially, flood prone and poorly drained areas.
Economic Loss:	Repair and replacement costs, business disruption, debris removal and clean-up costs.

Tornadoes and High Winds

Frequency:	An average of three tornadoes every two years occur in the State.
Potential Impacts:	Bodily harm and death, tree damage, utilities damage, property and content damage.
Vulnerable Locations:	Entire region, although Hartford County is at highest risk.
Economic Loss:	Repair and replacement costs, business disruption, debris removal and cleanup costs.

Severe Winter Storms

Frequency:	A severe winter storm (Blizzard, Nor'easter, Ice storm) is likely to occur once every five years or 20% chance of occurrence in any given year.
Potential Impacts:	Street closures, power outages, schools closures, utility damage, property and content damage, car accidents, tree damage, bodily harm and death.
Vulnerable Locations:	Entire region.
Economic Loss:	Repair and replacement costs, business disruption, debris removal and cleanup costs.

Table 17: Summary of Local Vulnerabilities to Natural Hazards and Key Issues

Summary of Local Vulnerabilities to Natural Hazards									
TOWN	DAM FAILURE	DROUGHT	EARTHQUAKE	FLOODS	WILDLAND & FOREST FIRES	HURRICANES & TROPICAL STORMS	TORNADOES & HIGH WINDS	WINTER STORMS	OTHER CONCERNS/ COMMENTS/ISSUES
Andover	SA	VP		VP, SA	SA		SA	VP, CF	Small municipal staff
Avon	SA			CF, VP, SA		TW		TW	Floods and storms can block certain roads creating transportation and access issues
Bloomfield	SA			SA, VP, CA	SA	VP, OC		OC	Debris management, transportation & access, non-resident public works staff
Bolton				SA		OC		OC	Power outages require generators for grinder pumps; experienced hail damage to crops & aluminum siding
Canton	SA			VP, SA	SA	TW, SA		TW, SA, VP	North Canton - access and fire; 21 Dowd - access and power
East Granby				SA	SA	OC		OC	Snow loads on flat roofs; areas with overhead wires
East Hartford				SA, VP, CF				VP, SA	Levee system upkeep; snow removal & storage; senior housing complexes; high heat strain on power system
Key:	CF = Critical Facility Impact			VP = Vulnerable Population Impact		TW = Town Wide Impact			
	SA = Specific Area Affected			CA = Cultural Assets Affected		OC = Other Concerns			

Note: This table summarizes the key issues local officials identified as concerns for their communities relating to natural hazards based on past occurrences of hazard events and the probability of impacts resulting from future events. Problem statements and additional details related to the concerns, risks and vulnerabilities of individual communities' structures, systems, populations, and other community assets can be found in their respective Challenges description in Section IV: Municipal Plans.

TOWN	DAM FAILURE	DROUGHT	EARTHQUAKE	FLOODS	WILDLAND & FOREST FIRES	HURRICANES & TROPICAL STORMS	TORNADOES & HIGH WINDS	WINTER STORMS	OTHER CONCERNS/ COMMENTS/ISSUES
East Windsor	SA	VP		CF, VP, SA		CA	CA	CA	Trolley Museum, Melrose Bridge
Ellington		VP, CF			SA	CF, CA		TW, SA	Transportation & access issues to Crystal Lake area; most town facilities are located in close proximity to each other.
Enfield	OC			SA		CF, SA, VP		CF	Communications - upstream dams; non-English speakers; group homes need generators
Farmington	SA			SA, CF		TW, OC		TW, OC	Transportation & access issues could affect evacuations
Glastonbury	SA	VP		SA, CF, CA		TW, OC		TW, OC	Backup power for town center
Granby				SA, VF, CF	SA	OC		SA, OC	Transportation & access, water wells (higher elevations)
Hartford				SA, CF	SA	VP		OC, CF	MDC Clean Water Project; snow storage; snow loads on roofs

Key: CF = Critical Facility Impact VP = Vulnerable Population Impact TW = Town Wide Impact
SA = Specific Area Affected CA = Cultural Assets Affected OC = Other Concerns

Note: This table summarizes the key issues local officials identified as concerns for their communities relating to natural hazards based on past occurrences of hazard events and the probability of impacts resulting from future events. Problem statements and additional details related to the concerns, risks and vulnerabilities of individual communities' structures, systems, populations, and other community assets can be found in their respective Challenges description in Section IV: Municipal Plans.

TOWN	DAM FAILURE	DROUGHT	EARTHQUAKE	FLOODS	WILDLAND & FOREST FIRES	HURRICANES & TROPICAL STORMS	TORNADOES & HIGH WINDS	WINTER STORMS	OTHER CONCERNS/ COMMENTS/ISSUES
Hebron		CF, SA		CF	SA	CF, SA		CF, OC	Power outages impact wells, grinder pumps & schools, town hall; debris & snow storage
Manchester	CF			CF, SA	SA				Coordinate with neighboring communities re dams and brush fires
Marlborough		TW		SA	SA	VP, TW		VP, TW	Power outages impact wells, & critical facilities
Newington	SA			SA, OC		CF, VP, TW			Amtrak and Busway projects
Rocky Hill				SA, CF				VP	Coordination with State for snow removal, disaster recovery; State Building Code; backup power for town facilities
Simsbury				CF, VP		VP		VP	Transportation & access; power outages
Somers				SA		CF		CF	Power outages/sheltering capacities
South Windsor	SA	TW	CF	SA, VP, CA		VP, TW, CF		VP, TW, CF	Power & communications outages, solar flares, debris management

Key: CF = Critical Facility Impact VP = Vulnerable Population Impact TW = Town Wide Impact
SA = Specific Area Affected CA = Cultural Assets Affected OC = Other Concerns

Note: This table summarizes the key issues local officials identified as concerns for their communities relating to natural hazards based on past occurrences of hazard events and the probability of impacts resulting from future events. Problem statements and additional details related to the concerns, risks and vulnerabilities of individual communities' structures, systems, populations, and other community assets can be found in their respective Challenges description in Section IV: Municipal Plans.

TOWN	DAM FAILURE	DROUGHT	EARTHQUAKE	FLOODS	WILDLAND & FOREST FIRES	HURRICANES & TROPICAL STORMS	TORNADOES & HIGH WINDS	WINTER STORMS	OTHER CONCERNS/ COMMENTS/ISSUES
Stafford	SA			SA, CF, CA	SA	VP			Stormwater management & drainage; sheltering capacity
Suffield	SA			SA		VP, CA			Street flooding: drainage & access; snow loads on roofs
Tolland				SA, VP	SA	VP, OC			Street flooding. Del-Aire Campground
Vernon				SA		CF			Back-up power for town facilities. Old mill buildings. Monitoring & alert systems
West Hartford	SA, CF	CA	TW	SA, VP, CF		TW, VP	TW	TW	Back-up power & sheltering
Wethersfield	SA		CF, VP	SA, CF, CA	SA	CF, VP, TW	CF	TW, CF	Communications & back-up power
Windsor	SA	SA	TW, CF	SA, VP, CF, CA	SA	TW, CF, VP	TW	TW, CF, VP	Transportation & access; Heat waves
Windsor Locks				SA, CF, VP		VP			Stormwater & drainage; Back-up power; Heat waves; Emergency notifications

Key: CF = Critical Facility Impact VP = Vulnerable Population Impact TW = Town Wide Impact
SA = Specific Area Affected CA = Cultural Assets Affected OC = Other Concerns

Note: This table summarizes the key issues local officials identified as concerns for their communities relating to natural hazards based on past occurrences of hazard events and the probability of impacts resulting from future events. Problem statements and additional details related to the concerns, risks and vulnerabilities of individual communities' structures, systems, populations, and other community assets can be found in their respective Challenges description in Section IV: Municipal Plans.

Section III: Mitigation Strategies

Natural Hazard Mitigation in the Capitol Region

In most cases, a severe natural hazard will affect several municipalities at once, though significant variations with highly localized damage can occur. In addition to the inevitable regional effect of natural hazards, CRCOG staff recognized common existing strategies, concerns and mitigation needs in the course of working with individual member municipalities on this plan. Therefore, this section reviews existing mitigation strategies common to most, if not all, thirty municipalities and the region and discusses the challenges that are common throughout the region. Because of the regional nature of natural hazards and common concerns, some mitigation activities are better addressed at the regional level; however, the means to carry out certain activities may not be available to regional agencies, but are available to municipalities. This section discusses the capabilities and effectiveness of the existing authorities, policies, programs, and resources available to accomplish hazard mitigation. This section also examines the municipal and regional strategies proposed and evaluates the costs and benefits associated with the myriad actions considered. This section also establishes our regional goals and objectives for addressing natural hazards and sets out the mitigation strategies and actions that may best be undertaken on a regional level. Finally, summaries and analyses of the mitigation activities and projects proposed by the municipalities are presented.

Our Capabilities for Implementing Mitigation Actions

The Capitol Region Council of Governments (CRCOG) is the largest of Connecticut's regional planning organizations. CRCOG was established in 1968 under the Connecticut General Statutes as a voluntary association of municipal governments serving the City of Hartford and 28 surrounding suburban and rural communities. The Town of Stafford joined CRCOG in September 2010, bringing the total membership to 30 municipalities. The Capitol Region Council of Governments is governed by a Policy Board comprised of the mayors, first selectmen, and town council chairs of its 30 member municipalities. Our members have collaborated on a wide range of projects to benefit our towns individually and the region as a whole. CRCOG serves the Capitol Region and its member municipalities by:

- Helping members improve governmental efficiency and save tax dollars through shared services and other direct service initiatives;
- Promoting efficient transportation systems, responsible land use and preservation of land and natural resources and effective economic development;
- Strengthening the Capitol City of Hartford as the core of a strong region, and as our economic, social and cultural center;
- Strengthening our regional community by helping coordinate regional agencies and programs;
- Advocating for the region and its towns with the State and Federal governments; and
- Assisting local governments and citizens in articulating, advocating and implementing the vision, needs and values of their regional community.
- To accomplish this work, CRCOG relies primarily on grants and member dues. CRCOG is not permitted to borrow money or issue debt in any form. As a regional planning organization, CRCOG does not have the ability to enact regulations, levy taxes or undertake construction projects.

Each of CRCOG's member municipalities has a broad scope of government authorities and powers including the ability to tax; establish laws, ordinances and regulations; exercise eminent domain; provide police protection; and establish, construct and maintain public facilities including roads, sewers, drainage and utilities. Municipal powers are outlined in the Connecticut General Statutes Sec. 7-148 (http://www.cga.ct.gov/2011/pub/chap098.htm#Sec7-148.htm). The table below outlines the governing structures of CRCOG's thirty municipal members.

Table 18: Capitol Region Member Communities' Municipal Governmental Structures

Municipal Governmental Structure		
Municipality	**Legislative Body**	**Chief Executive Officer**
Andover	Board of Selectmen	1st Selectman
Avon	Town Council	Town Manager
Bloomfield	Town Council	Town Manager
Bolton	Board of Selectmen	1st Selectman
Canton	Board of Selectmen	1st Selectman
East Granby	Board of Selectmen	1st Selectman
East Hartford	Town Council	Mayor
East Windsor	Board of Selectmen	1st Selectman
Ellington	Board of Selectmen	1st Selectman
Enfield	Town Council	Town Manager
Farmington	Town Council	Town Manager
Glastonbury	Town Council	Town Manager
Granby	Board of Selectmen	1st Selectman
Hartford	City Council	Mayor
Hebron	Board of Selectmen	Chairman
Manchester	Board of Directors	General Manager
Marlborough	Board of Selectmen	1st Selectman
Newington	Town Council	Mayor
Rocky Hill	Town Council	Town Manager
Simsbury	Board of Selectmen	1st Selectman
Somers	Board of Selectmen	1st Selectman
South Windsor	Town Council	Town Manager
Stafford	Board of Selectmen	1st Selectman
Suffield	Board of Selectmen	1st Selectman
Tolland	Town Council	Town Manager
Vernon	Town Council	Mayor
West Hartford	Town Council	Town Manager
Wethersfield	Town Council	Town Manager
Windsor	Board of Selectmen	1st Selectman
Windsor Locks	Town Council	Town Manager

Existing Strategies

Regional Cooperation and Services

The thirty municipalities participating in this planning process are members of the Capitol Region Council of Governments, a regional agency in which member communities have collaborated for over thirty years on a range of projects to benefit the municipalities individually and the region as a whole. This institutional experience and capacity allows CRCOG to provide services which can advance hazard mitigation throughout the region such as service sharing, cooperative purchasing and bidding services; public safety planning, training and collaboration; data analysis and sharing; transportation studies and planning and traffic incident management; and land use and natural resources conservation planning. Through these services, CRCOG helps member municipalities save tax dollars, coordinate efforts, and enhance operating efficiencies.

Regional Emergency Support Plan (RESP)

The purpose of the Regional Emergency Support Plan (RESP) is to provide a framework for the 42 DEMHS Region 3 communities and agencies to collaborate in planning, communication, information sharing, and coordination activities before, during, or after a regional emergency. The goal of this effort is to enhance the ability of each municipality to meet their emergency management objectives, which can be described as:

- maximize the preservation of life and property
- correct or alleviate, as expeditiously as possible, serious disaster or emergency-related conditions which present continued threats to the health or welfare of the residents of Region 3, and
- facilitate a return to normalcy by all practical means.

Emergency Alerting and Notification Systems

All of the CRCOG communities currently have a reverse notification system. This may be part of or an addition to the CT Alert Emergency Alerting and Notification System offered by the State of Connecticut. This emergency notification system, which relies on GIS technologies, will allow communities in the Region to alert residents to impending natural hazards, thereby reducing risks to life and property. According to the CTALERT.gov website, all Capitol Region municipalities except East Windsor currently subscribe to the CTAlert system. East Windsor is served by an E9-1-1 dispatch center (PSAP) which uses its own emergency notification system for local alerts. All citizens in Connecticut however can register with CTAlert to receive emergency notifications that are sent statewide.

National Flood Program, FEMA Flood Maps and Floodplain Regulations

The thirty Capitol Region municipalities have participated in FEMA's National Flood Insurance Program (NFIP) for at least thirty years and all are in good standing in the program. It is the intention of all municipalities in the region to continue participation in the NFIP including continued compliance and enforcement on the local level of all NFIP requirements. (See Table 19 below for the latest information on current flood insurance rate maps). All thirty municipalities have adopted floodplain management regulations that have helped to prevent increased flood risks from new developments. Most municipalities in the region incorporate floodplain regulations in their zoning regulations; others provide separate ordinances for floodplain regulation. (See Table 19 below.) The Connecticut Department of Energy and Environmental Protection (DEEP) periodically reviews these municipal regulations for conformance to the latest Flood Insurance Studies, FEMA flood maps and model flood hazard regulations. Chapter 124, Section 8-2 l of the Connecticut General Statutes governs the municipal regulation of development within floodplains as defined by the National Flood Insurance Program.

Table 19: Community Participation in National Flood Program

Community ID	Municipality	County	Initial FHBM Identified	Initial FIRM Identified	Current Effective Map Date
090161#	ANDOVER	TOLLAND	04/18/75	02/03/82	02/03/82
090021#	AVON	HARTFORD	01/23/74	05/16/77	09/16/11
090122#	BLOOMFIELD	HARTFORD	02/01/74	08/15/77	09/16/11
090109#	BOLTON	TOLLAND	06/07/74	06/01/81	06/01/81
090135#	CANTON	HARTFORD	08/02/74	08/01/79	09/16/11
090025#	EAST GRANBY	HARTFORD	05/31/74	01/06/82	09/16/11
090026#	EAST HARTFORD	HARTFORD	12/28/73	12/18/79	09/16/11
090027#	EAST WINDSOR	HARTFORD	11/16/73	04/03/78	09/16/11
090158#	ELLINGTON	TOLLAND	11/01/74	03/15/82	02/05/97
090028#	ENFIELD	HARTFORD	04/05/74	03/28/80	09/16/11
090029#	FARMINGTON	HARTFORD	06/28/74	08/15/77	09/16/11
090125#	GRANBY	HARTFORD	07/19/74	02/15/80	09/16/11
090124#	GLASTONBURY	HARTFORD	04/20/73	06/15/78	09/16/11
095080#	HARTFORD	HARTFORD	07/01/70	07/01/74	09/16/11
090162#	HEBRON	TOLLAND	11/29/74	10/15/81	03/18/91
090031#	MANCHESTER	HARTFORD	05/24/74	08/16/82	09/16/11
090148#	MARLBOROUGH	HARTFORD	07/19/74	05/17/82	09/16/11
090033#	NEWINGTON	HARTFORD	07/26/74	10/16/79	09/16/11
090142#	ROCKY HILL	HARTFORD	06/07/74	08/01/80	09/16/11
090035#	SIMSBURY	HARTFORD	08/02/74	05/16/77	09/16/11
090112#	SOMERS	TOLLAND	08/02/74	02/17/82	08/16/06
090036#	SOUTH WINDSOR	HARTFORD	08/16/74	05/01/80	09/16/11
090152#	STAFFORD	TOLLAND	08/09/74	06/01/82	06/01/82
090038#	SUFFIELD	HARTFORD	08/02/74	08/15/79	09/16/11
090171#	TOLLAND	TOLLAND	01/31/75	04/01/82	04/01/82
090131#	VERNON	TOLLAND	01/04/74	12/04/79	08/09/99
095082#	WEST HARTFORD	HARTFORD	NA	07/01/74	09/16/11
090040#	WETHERSFIELD	HARTFORD	05/11/73	05/02/77	09/16/11
090042#	WINDSOR LOCKS	HARTFORD	06/28/74	01/03/79	09/16/11
090041#	WINDSOR	HARTFORD	10/05/73	09/29/78	09/16/11

Source: FEMA National Flood Insurance Program Community Status Book
Information downloaded from www.fema.gov/cis/CT.pdf - 2012-03-28 on March 29, 2012

The National Flood Insurance Program offers an additional voluntary program, the Community Rating System (CRS), which provides discounts on flood insurance premiums to property owners. The CRS recognizes a community's efforts which go beyond the minimum standards for floodplain management by reducing flood insurance premiums from 5% to 45% depending on the number and type of activities undertaken in the community. These activities may include issuing elevation certificates for new construction in floodplains; outreach to property owners; maintaining flood and property data digitally; stormwater management regulations; open space preservation; and a host of other activities, many of which may be currently undertaken in a community. In the Capitol Region, only West Hartford currently participates in the CRS. A number of other municipalities have, however,

identified participation in the CRS as a mitigation action they will consider in this plan update. In the 2008 Plan, several communities identified investigating participation in the CRS program but were unable to advance this effort significantly. The limited progress made was generally due to constraints on the municipalities' ability to commit personnel to fully explore the program and its impact on and relevance to the community. Interest in the program continues, however. Eight communities (Granby, Hartford, Simsbury, Somers, South Windsor, Vernon, Wethersfield and Windsor) expressed an interest in undertaking this activity in the 2014-2019 planning period. CRCOG hopes that by assisting these communities, as well as others, through passing on notices of FEMA sponsored training opportunities and arranging for a local workshop, we can give added impetus to these efforts.

Table 20: Municipal Floodplain Regulations

Municipality	Regulation/Ordinance	Reference
Andover	Zoning Regulations	Section 10
Avon	Zoning Regulations	Section III G
Bloomfield	Zoning Regulations	Article 5.1
Bolton	Zoning Regulations	Section 3.A.18
Canton	Zoning Regulations	Article V. Section 53
East Granby	Zoning Regulations	Section III E
East Hartford	Zoning Regulations	Article VI Section 601
East Windsor	Zoning Regulations	Chapter VIII Section 810
Ellington	Zoning Regulations	Article 5
Enfield	Zoning Regulations	Article VIII Section 8.50
Farmington	Zoning Regulations	Article II. Sections 15, 16, 17
Glastonbury	Zoning Regulations	Section 4.11
Granby	Zoning Regulations	Section 8.18
Hartford	Zoning Regulations	Article III. Division 21 FP
Hebron	Zoning Regulations	Section 8.10
Manchester	Zoning Regulations	Article II Section 19
Marlborough	Code of Ordinances	Ordinance J. Flood Plain Management
Newington	Zoning Regulations	Section 6.3
Rocky Hill	Zoning Regulations, Town Code	Section 5.2, Chapter 141
Simsbury	Zoning Regulations	Article 7. Section M
Somers	Zoning Regulations	Article XV Section 214.84
South Windsor	Zoning Regulations	Article 5. Section 5.2
Stafford	Zoning Regulations	Section 5.20
Suffield	Zoning Regulations	Section 5. K.
Tolland	Zoning Regulations	Article XII Section 12
Vernon	Zoning Regulations	Section 5
West Hartford	Code of Ordinances	Chapter 177 – Zoning: Section 177-8
Wethersfield	Zoning Regulations	Article IV. Section 4.2
Windsor	Code of Ordinances	Chapter 3, Article III
Windsor Locks	Zoning Regulations	Section 223 (Appendix A)

Options for Mitigating Flood Losses

Floods are inevitable, but there are many different approaches that can help reduce flood losses. One common approach in the past has been to intensively manage river channels, by armoring and dredging and through the construction of berms, levees, and floodwalls. In addition to being very costly, these traditional engineering solutions often fail, leading to even more extensive and costly flood damages. This approach has been shown to be unsustainable, and has led to the situation we are in today, trapped in an escalating cycle of increasing flood damages and costly repairs. In addition, this engineering approach has negative impacts on the ecological health of river systems and the wildlife they support.

In recent decades, more environmentally-friendly river restoration techniques (including "natural channel design") have gained popularity. While these techniques still try to control riverine processes, they attempt to employ a more natural channel configuration. These restoration techniques can be an effective tool for mitigating fluvial erosion hazards by slowing bank erosion or limiting lateral channel migration. The high cost of designing and installing restoration projects limit the usefulness of restoration as a general approach to flood hazard mitigation. In addition, restoration projects are prone to failure, either during high flow events, or because the design may not have been compatible with river processes.

Another approach to mitigate flood losses is to remove or relocate existing structures which are threatened by flood hazards. Removal of structures from hazardous areas can be an effective approach when it is feasible. While removal or relocation is effective, it is generally far too costly to be applied at a broad scale. In addition, many large structures, particularly transportation infrastructure or public facilities, are rarely feasible to remove or relocate. Retrofitting, another engineering approach (which includes elevating and flood proofing) is appropriate for mitigating inundation hazards but is ineffective in addressing fluvial erosion hazards.

In sum, river management alternatives include stabilization practices, retrofit or removal of existing structures, active restoration, and avoidance. **The most cost-effective way to mitigate flood hazards is *avoidance*: limiting human investments in river corridors.** In addition to preventing future flood losses to structures built in hazardous areas, this approach limits constraints on a river, allowing them over time to achieve a more stable, equilibrium condition.

Source: Municipal Guide to Fluvial Erosion Hazard Mitigation, River Management Program Vermont Agency of Natural Resources, file:///K:/NOAA-CT%20River/VTrv_floodhazard.htm

Stormwater and Erosion Control

By statute (Section 22a-325 – 22a-329 of the CGS), all municipalities in Connecticut are required to adopt regulations pertaining to soil erosion and sediment control and all applications for proposed development which will disturb more than a half acre must include a soil erosion and sediment control plan. The DEEP has guidelines which serve as the technical standard for compliance with the statute. The *Connecticut Stormwater Quality Manual* provides guidance on site planning, source control and stormwater practices, including the design, construction and maintenance of stormwater systems, to protect the quality of Connecticut waters. The practices detailed in the Manual aim to reduce the volume of urban runoff and pollutant discharges, recharge groundwater and control peak flows. These types of stormwater best practices not only protect water quality, but also minimize flooding risks. The *Connecticut Guidelines for Erosion and Sedimentation Control* also detail specific measures that can reduce the damages and pollution associated with erosion and sedimentation, while simultaneously reducing flooding risks. In 2012, the State DEEP updated the Manual and Guidelines to incorporate appendices on Low Impact Development (LID). Low Impact Development manages stormwater by designing with nature in mind. LID techniques seek to retain stormwater close to where it falls thus keeping runoff out of pipes that drain to waterways. CRCOG encourages its member municipalities to adopt and enforce regulations that would require new development to implement these types of best practices in as far as is possible.

Open Space Acquisition

The permanent preservation of undeveloped land can help support natural hazard mitigation efforts by preventing development in areas prone to natural hazards such as floodplains and wildland/urban interfaces. The State of Connecticut has established a goal of preserving 21 percent (or 673,210 acres) of the state's land area for open space for public recreation and natural resource conservation and preservation by 2023. To-date, the State has preserved 255,030 acres throughout Connecticut. In the Capitol Region approximately 18% (or more than 94,116 acres of the region's 525,032 total acres) have been preserved.

The statute governing open space preservation, CGS section 23-8, divides responsibility for meeting this goal between the State (10% or 320,576 acres) and municipalities, non-profit land conservation organizations and water utilities (11% or 352,634 acres).The State provides financial assistance to municipalities, conservation organizations and water utilities to help them acquire land under a competitive grant program. Funding through the DEEP Open Space and Watershed Land Acquisition Grant Program is usually available every two years. According to the Connecticut Council on Environmental Quality's (CEQ) 2012 Annual Report, in 2012, State grants helped municipalities and land trusts acquire 740 acres. In 2012, in the Capitol Region, municipalities or organizations in Bloomfield, Canton, Bolton, Enfield, Hebron, Manchester, Simsbury, Somers, Tolland and Vernon were awarded funds for land acquisition. In 2010, in the Capitol Region, municipalities or organizations in Bloomfield, Canton, Ellington, Farmington, Glastonbury, Granby, Hebron, Simsbury, Somers, and Tolland were awarded funds for land acquisition. CRCOG assists municipalities and land trusts in their efforts to secure grants by writing letters of support on their behalf to the DEEP. The state grant program requires a local match be provided. Some municipalities have passed bond referenda and some local trusts have established fund raising programs to provide local resources for open space acquisition. At times these resources are used to provide the local match for the state grant; at other times they are used to acquire lands without state assistance.

Open space acquisition can be an effective means of preventing development in vulnerable areas, however, the CEQ 2012 Annual Report states that Connecticut is not on track for meeting its open space

preservation goal. While the report notes that probably thousands of acres are preserved by municipalities and land trusts in some years, there is no means to accurately track these acquisitions. To remedy the lack of an accurate inventory of open space, a new law, PA No. 12-52, An Act Concerning the State's Open Space Plan, was passed in 2012 which should eventually lead to an accurate inventory of preserved lands.

Conservation easements can also be granted to land trusts and municipalities for the purpose of preserving and preventing development on environmentally sensitive lands. Municipalities often acquire conservation easements through the land development approval process. Conservation easements constitute a legally binding agreement that limits certain types of uses or prevents development on land which remains privately held.

Regulation of Wetlands and Watercourses

Activities in wetlands areas and watercourses are regulated under Chapter 440 (Sec. 22a-28 – Sec. 22a-45d) of the Connecticut General Statutes. Under this statute, each municipality is required to establish an inland wetlands agency, identify boundaries of inland wetlands and watercourse areas, promulgate regulations to protect the inland wetlands and watercourses within its boundaries, and require that no regulated activities shall be conducted without a permit. All municipalities in the region have established inland wetlands agencies (see Table 20) and have enacted inland wetlands and watercourses regulations. According to the Connecticut Council on Environmental Quality (CEQ), between 60 and 90 acres of inland wetlands were altered statewide by development from 2004 until 2011 when the rate spiked to more than 200 acres. (Detailed data are not available to the public or CEQ.) Also according to CEQ, municipal agencies, which issue 95 percent of all inland wetlands permits, have become more conserving of wetlands in recent years. CEQ attributes this increased protectiveness to the completion of wetlands training programs by municipal agency members and staff.

Plans of Conservation and Development

Regional planning agencies and municipalities are required by state law (Chapter 127, Section 8-35a and Chapter 126, Sec. 8-23, respectively) to update plans of conservation and development every ten years. These plans outline the policies and goals for physical and economic development of the region or municipality. (See Table 21.)

Table 21: Municipal Land Use Agencies and Plans

Municipality	Current Plan of Conservation & Development	Agency Responsible for Enacting Zoning Regulations	Designated Inland Wetlands Agency
Andover	2005-2015	Planning & Zoning Commission	Inland Wetlands Commission
Avon	Adopted 2006 (Last amended 2013)	Planning & Zoning Commission	Inland Wetlands Commission
Bloomfield	2012-2022	Plan & Zoning Commission	Inland Wetlands and Watercourses Commission
Bolton	2005-2015	Planning & Zoning Commission	Inland Wetlands Commission
Canton	2014-2024	Zoning Commission	Inland Wetlands and Watercourses Commission
East Granby	2004-2014	Planning & Zoning Commission	Conservation Commission

Municipality	Current Plan of Conservation & Development	Agency Responsible for Enacting Zoning Regulations	Designated Inland Wetlands Agency
East Hartford	2003-2013 (Update is currently under way)	Planning & Zoning Commission	Inland Wetlands/Environment Commission
East Windsor	2004-2014	Planning & Zoning Commission	Inland Wetlands Watercourse Agency
Ellington	2008-2018	Planning & Zoning Commission	Inland Wetlands Agency
Enfield	2011-2021	Planning & Zoning Commission	Inland Wetlands and Watercourses Agency
Farmington	2008-2018	Planning & Zoning Commission	Inland Wetland Commission
Glastonbury	2007-2017	Town Council	Conservation Commission/Inland Wetlands and Watercourses Agency
Granby	2005-2015 (Last amended 2007)	Planning & Zoning Commission	Inland Wetlands and Watercourses Commission
Hartford	2010-2020	Planning & Zoning Commission	Planning & Zoning Commission
Hebron	2004-2014 (Update is currently under way)	Planning & Zoning Commission	Conservation Commission/ Inland Wetland Agency
Manchester	2013-2023	Planning & Zoning Commission	Planning & Zoning Commission/Inland Wetlands Commission
Marlborough	2009-2019	Zoning Commission	Conservation Commission
Newington	2010- 2020	Planning & Zoning Commission	Conservation Commission/ Inland Wetlands Commission
Rocky Hill	2001-2011 (Update is currently under way)	Planning & Zoning Commission	Open Space & Conservation Commission
Simsbury	2007-2017	Zoning Commission	Conservation Commission/ Inland Wetlands Agency
Somers	2004-2014	Zoning Commission	Conservation Commission
South Windsor	2013-2023	Planning & Zoning Commission	Inland Wetlands Agency/Conservation Commission
Stafford	2012-2022	Planning & Zoning Commission	Inland Wetlands Commission
Suffield	2010-2020 (Amended 2012)	Zoning & Planning Commission	Conservation Commission
Tolland	2006-2016	Planning & Zoning Commission	Inland Wetlands & Watercourses Commission
Vernon	2012-2022	Planning & Zoning Commission	Inland Wetlands Commission
West Hartford	2009-2019	Town Plan & Zoning Commission	Town Plan & Zoning Commission
Wethersfield	2013-2023	Planning & Zoning Commission	Inland Wetlands and Watercourses Commission
Windsor	2004-2014 (Amended 2008; Update is currently under way)	Town Planning & Zoning Commission	Inland Wetlands and Watercourses Commission
Windsor Locks	2007-2017	Planning & Zoning Commission	Inland Wetlands and Watercourses Commission

State Building Code

Connecticut municipalities employ the 2005 State Building Code which is periodically amended. According to the Connecticut Department of Construction Services, the 2013 Amendment to the State Building Code is proposed to be adopted on October 1, 2013. The 2013 Amendment includes the 2009 International Residential Code and the 2011 National Fire Protection Association 70: National Electric Code along with the Connecticut Code changes. Also, a new State Building Code is planned for adoption in 2015 and will include 2012 International Building, Existing Building, Plumbing, Mechanical, Energy Conservation, and Residential Codes, 2014 National Electrical Code (NFPA 70), and a supplement of Connecticut specific items. The Code incorporates the standards in high-wind design and seismic activity appropriate for the State. Local building officials are bound by the State Code. Through local implementation of the State Building Code, Capitol Region municipalities help reduce the risks associated with natural hazards in new developments.

Dam Safety

The Dam Safety Section of the Connecticut Department of Energy and Environmental Protection's Inland Water Resources Division enforces the state's dam safety laws. The Dam Safety Office administers the inspection of existing dams, dikes or similar structures, and the permitting process for the construction, repair or alteration of dams. The Office inspects hundreds of dams annually based on their classification and potential risk to life and property, and then targets a limited number of lower hazard dams for inspection on a rolling basis. Any dams deemed unsafe upon inspection must be repaired by the owner. The Office of Dam Safety works to minimize the potential damage of dam breaches.

According to *Connecticut's 2010 Natural Hazard Mitigation Plan Update*,

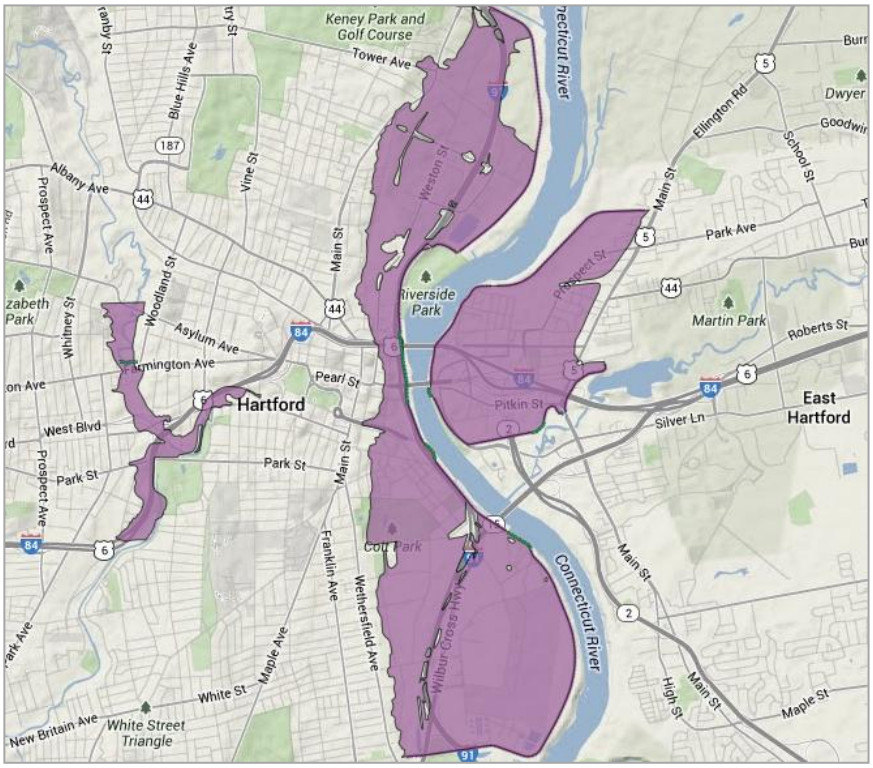
> Dams which receive Dam Construction permits for repair and/or reconstruction are designed to pass at least the 100-year rainfall event with one foot of freeboard (a factor of safety against overtopping). The most critical and hazardous dams are required to meet a spillway design standard much higher than passing the runoff from a 100-year rainfall event. Although not all of the dams under DEP jurisdiction have been shown to be able to withstand the 100-year rainfall event, most of the dams meet this standard due to original design requirements or recent spillway upgrades. For the most part if smaller rainfall events, i.e., the 10-year and 25-year events occur more frequently there will be little impact on the ability of Connecticut dams to operate safely.
>
> As more and more state owned and privately owned dams get repaired, the number of dams that will not meet the state minimum requirements for spillway design diminishes. However, the average age of all dams in Connecticut increases and we should remain vigilant.

Levees

There are levees in the City of Hartford and the Town of East Hartford which provide invaluable flood protection for the residents and businesses of those municipalities. In East Hartford, a nearly 4 mile long levee runs along the east side of the Connecticut River and north of the Hockanum River keeping flood waters from over 728 acres of land generally west of Main Street. In Hartford, a 7.27 mile long levee runs along the west side of the Connecticut River providing coverage for over 2,176 acres of

land. Also in Hartford, a .14 mile long levee runs along the Park River providing flood coverage for over 200 acres on the west side of the City. (See the map below.) These levees were constructed by the U.S. Army Corps of Engineers and are overseen by the USACE Levee Safety Program but the municipalities are responsible for operations and maintenance. The levee systems are periodically inspected. Each received a minimally acceptable inspection rating in 2012 signaling that one or more inspection items were rated as unacceptable but an engineering determination concluded these issues would not prevent the system from performing as intended during the next flood event. The municipalities have proposed measures to address the identified inspection issues.

Figure 10: Leveed Areas in East Hartford and Hartford



Source: USACE National Levee Database, http://nld.usace.army.mil

USDA Assistance

Several towns within the Region have used the technical and financial assistance of the U.S. Department of Agriculture's Natural Resources Conservation Service (NRCS) to minimize damages from natural disasters. The Emergency Watershed Program provides financial and technical assistance to the state and towns to address dangerous problems that result from natural hazards. The Watershed Protection and Flood Prevention program provides technical assistance in designing and planning for structural measures to reduce flooding damage. The Connecticut Department of Energy and Environmental Protection then assists in the actual installation of planned measures.

Forest Fire Aid

There are procedures in place for requesting assistance or other resources to aid in responding to all hazards including forest and wild land fires. In the State of Connecticut, the first responding authority would be the local jurisdiction. If there is a need for additional aid or resources beyond the local capabilities, the Intrastate Mutual Aid Compact (CGS Sec. 28-22a) outlines the process for requesting assistance. If regional resources are depleted, the Connecticut Department of Energy and Environmental Protection's Division of Forestry may be requested to assist local fire departments in suppressing wildland fires. The Forestry Division maintains an active forest fire prevention program and a specially-trained force of fire fighting personnel to combat fires that ravage an average of 1,300 acres of forestland per year. During the spring fire season and at other times of high or above fire danger, the Division broadcasts daily predictions of fire danger and issues advisories to state park staff, municipalities, fire departments and the media. The Division also has crews ready to assist the US Forest Service in controlling large fires across the nation.

Summary of Effectiveness of Existing Strategies, Authorities, Policies, Programs and Resources

The communities of the Capitol Region have a variety of tools and resources to draw upon to prepare for and mitigate the impacts of natural hazards. Connecticut municipalities are enabled with a broad scope of government authorities and powers including the ability to tax; establish laws, ordinances and regulations; exercise eminent domain; provide police protection; and establish, construct and maintain public facilities and infrastructure. The municipalities have established commissions and boards to undertake their planning, zoning, inland wetlands, development, and conservation responsibilities. These commissions and boards are supported by professional staff and/or consultants. Local communities also have either full-time or volunteer fire departments. Police services are provided by a local department in most communities; however, in smaller communities, a resident state trooper may provide police services. Most municipalities also have public works or highway departments and building inspection departments.

While much has been accomplished to implement natural hazard mitigation throughout the region, because of local governments' broad range of responsibilities and financial limitations, resources may not be applied to natural hazard mitigation at a level which allows the communities to accomplish all their proposed mitigation actions within the timeframes proposed. Networks for collaboration among government agencies at the local, state and federal level, as well as with regional agencies and various organizations also have been established and are effective in supporting and supplementing the capabilities of individual communities. The ability of communities and the CRCOG to receive state and federal grants and other assistance also improves the effectiveness of local and regional hazard mitigation efforts.

Resources

The following sources of funding and technical assistance may be available for the mitigation projects identified by each community.

General Hazard Mitigation

- ☐ FEMA Hazard Mitigation Grant Program (HMGP) – *funding for hazard mitigation projects following a presidentially declared disaster. More information on the HMGP program can be found at: http://www.fema.gov/hazard-mitigation-grant-program and at http://www.ct.gov/demhs/cwp/view.asp?a=4062&q=515030.*

- ☐ FEMA Pre-Disaster Mitigation Grant Program (PDM) – *funding for hazard mitigation projects on a nationally competitive basis. More information on the PDM program can be found at: http://www.fema.gov/pre-disaster-mitigation-grant-program and at http://www.ct.gov/deep/cwp/view.asp?a=2720&q=325654&deepNav_GID=1654*

- ☐ U. S. Small Business Administration – Disaster Loan Program – *provides funding to individuals, businesses and non-profits including relocation loans. More information can be found at: http://www.sba.gov/content/disaster-loan-program*

- ☐ U. S. Economic Development Administration-Disaster Recovery –*EDA assists local governments affected by disasters. More information can be found at: http://www.eda.gov/disasterrecovery.htm*

- ☐ U.S. Department of Housing and Urban Development - CDBG Disaster Recovery Assistance- *HUD provides flexible grants to help cities, counties and States recover from presidentially declared disasters, especially in low-income areas, subject to availability of supplemental appropriations. More information can be found at: http://portal.hud.gov/hudportal/HUD?src=/program_offices/comm_planning/communitydevelopment/programs/drsi*

- ☐ U.S. Department of Housing and Urban Development – CDBG Program – *generally CDBG funds to municipalities can be used as local match for other federal assistance granted for disaster mitigation provided the activity meets all applicable CDBG requirements. More information can be found at: http://portal.hud.gov/hudportal/HUD?src=/program_offices/comm_planning/communitydevelopment/programs*

- ☐ Connecticut Department of Housing CDBG Small Cities Program- *This federally funded program provides funding to municipalities with populations of less than 50,000 for a variety of activities including acquisition of property, relocation, public facilities and improvements, code enforcement, planning and capacity building, among other uses. More information can be found at: http://www.ct.gov/doh/cwp/view.asp?a=4513&q=530474*

- ☐ Connecticut Department of Energy and Environmental Protection (DEEP) Open Space and Watershed Land Acquisition Grant Program – *provides financial assistance to municipalities and nonprofit land conservation organizations to acquire open space. More information can be found at: http://www.ct.gov/deep/cwp/view.asp?a=2706&q=323836&deepNav_GID=1641*.

- ☐ Connecticut Department of Energy and Environmental Protection (DEEP) Nonpoint Source Management Grant Program – *provides grants for the prevention, control and/or abatement of nonpoint source pollution. Funded under Section 319(h) of the Federal Clean Water Act. More information can be found at:* http://www.ct.gov/deep/cwp/view.asp?a=2719&q=325594&deepNav_GID=1654

- ☐ Connecticut Department of Emergency Services and Public Protection, Division of Emergency Management and Homeland Security – *provides strategic planning and grant assistance. More information can be found at:* http://www.ct.gov/demhs/cwp/.

- ☐ Connecticut Land Conservation Council – *can provide funding and advice on additional sources of funding to local land trusts for open space acquisition. More information can be found at: http://www.ctconservation.org/fundingprograms*.

- ☐ AmeriCorps – *service project teams may be available to assist with projects such as surveying, tree planting, restoration, construction, and environmental education. More information on AmeriCorps can be found at: http://www.americorps.gov/for_organizations/overview/index.asp and at http://www.nationalservice.gov/profiles2013/state_profiles_detail.asp?tbl_profiles_state=CT*.

Flood Mitigation

- ☐ FEMA Flood Mitigation Assistance (FMA) Program – *grants for flood hazard mitigation planning and projects such as property acquisition, relocation of residents, and flood retrofitting. More information can be found at:* http://www.fema.gov/flood-mitigation-assistance-program.

- ☐ FEMA National Flood Insurance Program Community Rating System, http://www.fema.gov/national-flood-insurance-program-community-rating-system

- ☐ U.S. Army Corps of Engineers Flood Risk Management Program – *50/50 match funding for flood proofing and flood preparedness projects. More information can be found at: http://www.iwr.usace.army.mil/Missions/FloodRiskManagement/FloodRiskManagementProgram.aspx*

- ☐ U.S. Department of Agriculture Natural Resources Conservation Service Emergency Watershed Protection and Watershed and Flood Prevention Operations Programs – *technical and financial assistance to reduce or prevent flood damage, reduce soil erosion and improve water quality. More information can be found at: http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/landscape/wfpo/* and at http://www.nrcs.usda.gov/wps/portal/nrcs/main/ct/programs/financial/ewp/

- ☐ Capitol Region Council of Governments - *Assistance to municipalities for road and bridge projects which could include related drainage improvements. Funding for this assistance is through federal and state sources and subject to specific program requirements. More information can be found at:* http://www.crcog.org/transportation/tip_proj/project.html and at http://www.crcog.org/publications/TransportationDocs/2011-1104MunicipalFundingSources.pdf

Hurricane Mitigation

- ☐ FEMA Mitigation Assessment Team Program - *technical assistance to state and local governments provided through reports and technical manuals based on assessments of building performance in response to disasters. More information can be found at: http://www.fema.gov/mitigation-assessment-team-program.*

Wildfire Mitigation

- ☐ Assistance to Firefighters Grant Program – *grants are provided to fire departments to enhance their ability to protect the public and fire service personnel from fire and related hazards. More information can be found at: http://www.fema.gov/welcome-assistance-firefighters-grant-program*

Dams and Levees

- ☐ Association of State Dam Safety Officials- *Website with advice and information on dam safety. More information can be found at: http://www.damsafety.org/*

- ☐ Connecticut Department of Energy and Environmental Protection (DEEP) Dam Safety Program - More information can be found at: *http://www.ct.gov/deep/cwp/view.asp?a=2720&q=325634&deepNav_GID=1654*

- ☐ U.S. Army Corps of Engineers Levee Program – *Information on levee safety, risk assessment and risk reduction. More information can be found at: http://www.usace.army.mil/Missions/CivilWorks/LeveeSafetyProgram/USACEProgramLevees.aspx*

Power Outages

- State of Connecticut, Microgrid Program – An initial award of $18 million was announced in 2013 for nine microgrid projects in Connecticut including one in Hartford's Parkville neighborhood and one for the University of Hartford and St. Francis Hospital. An additional $15 million in funding to continue microgrid work was authorized as part of the State's FY14-FY15 Biennial Budget. *More information can be found at: http://www.ct.gov/deep/cwp/view.asp?Q=534450&A=4380* and at *http://www.governor.ct.gov/malloy/cwp/view.asp?Q=529952&A=4010.*

- FEMA Hazard Mitigation Grant Program (HMGP) – *funding for hazard mitigation projects following a presidentially declared disaster including for the purchase and installation of generators for critical facilities. More information on the HMGP program can be found at: http://www.fema.gov/hazard-mitigation-grant-program and at http://www.ct.gov/demhs/cwp/view.asp?a=4062&q=515030.*

Vulnerable Populations

The information on the following pages is provided courtesy of Shirley Bergert, Connecticut Legal Services, Inc.

Resources for Planning and Responding Effectively: Vulnerable Populations

Prepared by Shirley Bergert, CT Legal Services, Inc., PO Box 258, Willimantic, CT 06226, 860.786.6375

June 19, 2012

For planning purposes in a utility outage:

- assume all systems are interrupted, including water, fuel, transportation and communications, and the medical infrastructure (access to care, medical records, medication) and care providing facilities are compromised; and

- understand planning will ultimately result in an effective response only if all responders, from utility crews to private emergency and government responders, plan together and respond with common expectations regarding roles and procedures.

The following is a list of ***practical*** resources with some overlap in terms of information and planning, particularly planning for needs of various vulnerable populations (*e.g.,* disabled, elderly, linguistic minorities), so the subset titles are for general guidance only. Where available, computer links are provided to the information referenced, along with other contact information, to allow ready access. Funding listed is largely for individual relief needs (not for planning), though some funding resources for planning also exist.

Federal Emergency Management Agency (FEMA) National Incident Management System:

FEMA is responsible for providing and coordinating emergency services in Presidentially declared disaster areas, working with federal, state and local governments and voluntary organizations. In a disaster, **a**ssistance is only provided when a governor requests it, and when the response needed is certified to be beyond the capabilities of the state (http://www.fema.gov/hazard/guidance.shtm - 42 USC §5121-5206 and 44 CFR 206).

Under Stafford Disaster Relief and Emergency Assistance Act, 42 USC §5174, FEMA's Individuals and Households Program (IHP) can provide financial assistance and direct services to people in the area with necessary expenses and serious needs related to the disaster not covered through other means (*e.g.,* medical, dental, funeral, personal property, transportation, moving and storage expenses). Limited assistance, including grants, can be provided to individuals to obtain a safe, sanitary, and secure place to live, make emergency home repairs (including structural repairs and heating, ventilating, air conditioning, electrical, plumbing, and gas systems), and for up to 18 months of rental assistance, and commodities (*e.g.,* food and water) can be brought in (not via individual grants). Special assistance is available for the elderly, crisis counseling services and legal assistance may be available for low income households. Assistance provided does not count in determining eligibility for needs-based welfare assistance programs and grants do not have to be repaid. Individual assistance is not available to undocumented immigrants unless living in a household with a citizen or qualified alien.

Emergency assistance: http://www.fema.gov/emergency/nims/, FEMA Helpline: 1-800-621-3362 (TTY 1-800-462-7585 for the hearing impaired); FEMA, US Department of Homeland Security, 500 C Street SW, Washington, D.C. 20472, 202-646-2500.

US Department of Health and Human Services:

- **Emergency Support Functions** (ESFs) is the grouping of governmental and certain private sector capabilities into an organizational structure to provide support, resources, program implementation, and services likely needed to save lives, protect property and the environment, restore essential services and critical infrastructure, and help victims and communities return to normal following disasters. http://www.phe.gov/Preparedness/support/emergencypreparedness/Pages/default.aspx , Assistant Secretary for Preparedness and Response (ASPR), US Department of Health and Human Services, 200 Independence Ave., SW, Washington, DC 20201.

- **Office of Human Services Emergency Preparedness and Response** has information available on services needed in response to disasters, including specific information on planning for **children and the range of people with special needs**: http://www.acf.hhs.gov/ohsepr/. OHSEPR, 370 L'Enfant Promenade, SW 6th Fl. West, Washington, D.C. 20447, 202-401-9306.

- **Needs of special populations**: Planning and assistance information is available regarding a range of special populations in disasters, including **persons with disabilities, elderly, hearing impaired, visually impaired, pregnant women, persons with diabetes, children, Native Americans, Latinos and other cultures**. http://sis.nlm.nih.gov/outreach/specialpopulationsanddisasters.html.

- **Center for Medicaid and Medicare Services (CMS)** oversees the administration of Medicaid and Medicare. It has the capability to take steps to ensure **medical care continuity in disasters**. http://www.cms.gov/About-CMS/Agency-Information/Emergency/index.html?redirect=/Emergency/01_overview.asp. It has a pamphlet regarding accessing medical care and prescriptions in an emergency: http://www.medicare.gov/Publications/Pubs/pdf/11377.pdf. For lost plan information, accessing alternate medical care, and other problems related to Medicare: 1-800-633-4227 (TTY: 1-877-486-2048).

- **Substance Use and Mental Health**: Disaster Technical Assistance Center (DTAC) -- part of the Substance Abuse and Mental Health Services Administration (SAMHSA) at the US Department of Health and Human Services -- free services, including technical assistance, training and consultation provided to states, territories, federally recognized Tribes, and local entities to prepare for delivery of **behavioral health services** in response to disasters. There are materials on the website regarding particular problems and different types of affected populations, and a free newsletter. samhsa.gov/dtac/ and DTAC@samhsa.hhs.gov; 4350 East West Highway Suite 1100, Bethesda, MD 20814, 1-800-308-3515, fax: 240-744-7005.

Elderly:

- **AARP, 2006.** ***We can do better: Lessons Learned for Protecting Older Persons in Disasters,*** http://assets.aarp.org/rgcenter/il/better.pdf [PDF - 120 Kb]. This free publication provides information and practical planning guidance regarding **elderly and disabled populations in the**

community and in institutional settings, covering: planning and communications; identification of those needing help and the kind of help needed, including registries, tracking and medications; and evacuation, including transportation issues and "special needs" shelters.

- **Alzheimer's Association** has information on preparing for care of **individuals with dementia** in disasters. http://www.alz.org/safetycenter/we_can_help_safety_disaster.asp. Alzheimer's Association National Office, 225 N. Michigan Ave. Fl. 17, Chicago, IL 60601, 1-800-272-3900.

- **US Administration on Aging (AoA):**

  - **Planning and response information**: AoA has information on planning for disasters impacting the **elderly**, including information for individuals and the networks serving them: http://www.aoa.gov/AoARoot/Preparedness/index.aspx; http://www.aoa.gov/AoARoot/Preparedness/Resources_Individuals/index.aspx; http://www.aoa.gov/AoARoot/Preparedness/Resources_Network/index.aspx.

  - **Disaster assistance funding**: AoA sets aside grant funding under the Older Americans Act (42 USC § 3030) for state Agencies on Aging and Title VI tribal organizations impacted by Presidentially declared national disasters. Funding can be used for **"gap-filling" services for the elderly and immediate needs** including food, supplies, home delivered meals, home clean up and safety, emergency medications, transportation, and outreach, information and assistance, counseling, case management and advocacy. http://www.aoa.gov/AoARoot/Grants/Funding/index.aspx, 202-357-3585.

Persons with Disabilities:

- **Interagency Coordinating Council on Emergency Preparedness and Individuals with Disabilities,** was established by Presidential Executive Order 13347 (Fed. Reg., Vol. 69, No. 142, p. 44573, 7/26/2004) to address the needs of persons with disabilities and ensure the federal government appropriately supports safety and security for individuals with disabilities in disaster situations, www.dhs.gov/disabilitypreparedness, US Department of Homeland Security, Office for Civil Rights and Civil Liberties, Interagency Coordinating Council on Emergency Preparedness and Individuals with Disabilities, Building 410, Mail Stop #0190, Washington, D.C. 20528, 202-401-1474 or 1-866-644-8360, 202-401-0470 or TTY: 1-866-644-8361, fax: 202-401-4708, disability.preparedness@dhs.gov.

- **US Department of Justice** has created a practical guide regarding plans for assisting **people with disabilities and their families** in case of disaster: "ADA Guide for Local Governments: Making Community Emergency Preparedness and Response Programs Accessible to People with Disabilities". www.usdoj.gov/crt/ada/emergencyprep.htm.

- **Disability.gov** is the federal government web portal for accessing comprehensive information on disability programs, services and resources from federal, state and local government agencies, academic institutions and nonprofits. It has links focused on emergency preparedness resources for **persons with disabilities** which allow you to link to federal and state-by-state resources: https://www.disability.gov/emergency_preparedness. The lists include extensive links to information directed to planners, facilities, responders and individuals.

- **National Council on Disability** (small federal agency), has analysis to assist in development of evidence-based policies, programs and practices regarding emergency preparedness and disaster relief for **people with disabilities**, "Effective Emergency Management: Making Improvements for Communities and People with Disabilities," 2009: http://www.ncd.gov/policy/emergency_management, National Council on Disability, 1331 F Street, NW, Suite 850, Washington, DC 20004, 202-272-2004, (TTY: 202-272-2074), fax: 202-272-2022.

- **National Organization on Disability** (NOD) has information regarding planning for persons with disabilities before, during and after emergencies, including specific materials for planners and responders, and **people with mobility, sensory, and developmental or cognitive disabilities and issues involving pets or service animals**: http://nod.org/research_publications/emergency_preparedness_materials/, NOD, 5 East 86th St., NY, NY 10028, 646-505-1191, 202-293-5960.

Medical Care and Infrastructure:

- **Center for Disease Control has information on:**
  - planning and assistance for **persons with chronic conditions:** http://emergency.cdc.gov/disasters/chronic.asp.
  - dealing with **extreme heat**: http://emergency.cdc.gov/disasters/extremeheat/.
  - dealing with hypothermia, wind chill, frostbite and **extreme cold:** http://emergency.cdc.gov/disasters/winter/.
  - planning information for **schools:** http://emergency.cdc.gov/schools/.
  - planning for **healthcare facilities including hospitals, long-term, acute and chronic care facilities, doctor offices and clinics**: http://emergency.cdc.gov/healthcare/.

  CDC, 1600 Clifton Rd., Atlanta, GA 30333, 800-232-4636, TTY: 888-232-6348.

- **Association of State and Territorial Health Officials (ASTHO) has materials on responding to disasters from a public health perspective**: http://www.astho.org/Search.aspx?s=disaster%20planning

- **The Joint Commission** handles accreditation of health care organizations, including hospitals, doctor's offices, nursing homes, office-based surgery centers, behavioral health treatment facilities and providers of home care services. They have resources for **planning for medical needs** in case of disasters: http://www.jointcommission.org/search/default.aspx?Keywords=disaster+planning&f=sitename&sitename=Joint+Commission.

Emergency Food

The Food Research Action Center (FRAC) has information on disaster related food assistance (Supplemental Nutrition Assistance Program or SNAP) -- the webpage listing resources: http://frac.org/federal-foodnutrition-programs/snapfood-stamps/disaster-snapfood-stamps/. These resources include FRAC's advocates' guide with details on the types of food disaster assistance available

and accessing such assistance, which must be requested by state officials: http://frac.org/newsite/wp-content/uploads/2009/09/dfspguide06.pdf. Programs covered in the guide include the following:

- **Disaster Food Stamp Program**: When large numbers of people are affected, a state can ask the US Department of Agriculture's Food and Nutrition Service (USDA/FNS) to approve replacement food stamps and expand eligibility to households not ordinarily eligible for food stamps.
- **Food stamp waivers**: In situations involving fewer numbers of households, a state can ask USDA for a waiver expanding the time period food stamp recipients have to ask for replacement food stamps in emergencies, relaxing verification requirements and expanding eligibility.
- **Commodity food distribution**: With USDA permission, a state can use commodities provided for school lunches at mass feeding sites; in a Presidentially declared disaster, the commodities can be provided to individual households.
- **School meal programs**: USDA can waive requirements regarding eligibility and food options to remove barriers to children accessing needed food.
- **Child and Adult Care Food Program**: USDA can waive program requirements in CACFP, which reimburses for food served in child care and adult care homes and centers to protect the health and safety of those in care.
- **Supplemental Nutrition Program for Women, Infants and Children** (WIC): States can develop plans for WIC continuity in disasters in advance. If such a plan is not in place, USDA can approve alternate procedures.

FRAC, 1875 Connecticut Ave. NW, Suite 540, Washington, DC 20009, 202-986-2200, http://www.frac.org.

Emergency Energy Assistance:

States have a great deal of flexibility in determining how to expend federal block grant funding under the Low Income Home Energy Assistance Program. However, assistance under state plans filed with US Department of Health and Human Services has to be related to energy needs and statutory restrictions cannot be waived. States can provide assistance to households up to 60% of state median income, can define crisis and emergency benefits, and can use some energy assistance for weatherization. The following are some of the types of emergency help that can be made available: costs for temporary shelter where homes have been destroyed or damaged, transportation costs to move individuals away from the crisis area to shelters when health and safety is endangered by loss of access to heating or cooling, utility deposits and reconnection costs, repair or replacement costs for furnaces and air conditioners, purchase of fans, air conditioners and generators, insulation repair, and coats and blankets to keep individuals warm. Note however that, to the extent LIHEAP funding is used for these purposes, less funding is available to meet energy expenses for households.
http://www.acf.hhs.gov/programs/ocs/liheap/guidance/special_topics/disaster_relief.html ,
Administration for Children and Families, 370 L'Enfant Promenade, S.W., Washington, D.C. 20447.

Note: States have numerous block grants, where, similar to LIHEAP, the state can modify the plan approved by the federal government to provide for individual emergency relief. These include the Temporary Assistance to Needy Families, Social Services Block Grant, and Community Development Block Grant.

Challenges

The following challenges faced by local communities in implementing hazard mitigation measures are common to most municipalities in the region. In the listing of municipal mitigation strategies which follows, some additional challenges unique to certain communities may be included; however, the following challenges apply to most Capitol Region municipalities. These challenges can impact the effectiveness of existing authorities, policies, programs and resources; however it should be noted that local governments have a number of procedures and tools available which can allow them to adjust, over time, their programs, procedures and resources to more effectively mitigate natural hazards.

Limited Resources

Local communities, as well as state and federal governments, private enterprise, non-profit organizations, and households, all face financial limitations which can restrict their ability to fully implement measures and activities which are in their best interest. At the local level most financial resources are provided through property tax revenue with additional support from state and federal governments through various programs and grants. The lingering effects of the Great Recession have severely tightened most local budgets. Through the local political and planning processes and budget deliberations, municipalities routinely reevaluate local programs and policies and adjust spending priorities. Expenditures on programs which support natural hazard mitigation may not always be considered by a community and its citizens as high priority as expenditures related to schools or other local initiatives as well as those related to mandated programs and expenditures. The lack of or limits on funding can lead to reduced effectiveness in a municipality's capability to accomplish hazard mitigation. At the regional level, CRCOG's ability to implement mitigation activities is also tied to financial limitations. Our funding is derived primarily from state and federal grants and programs and municipal dues. As these various levels of governments face financial cutbacks and changes in spending priorities, financial support to CRCOG can be impacted.

Multiple Jurisdictions

Hazard mitigation requires coordination among the multiple federal, state and local agencies that influence development, maintenance, and emergency response activities. At the local level, some municipalities have difficulties getting their inland wetlands commissions and public works staff to agree on the appropriateness of drainage maintenance activities to reduce flooding risk. In addition, some communities face flooding risks from natural and/or manmade influences located in other communities, requiring interlocal coordination and communication. Finally, it can be difficult for a community to take full advantage of available federal and state resources for mitigation activities because programs are spread among different departments and agencies such as FEMA, the U.S. Department of Agriculture, the Connecticut Department of Energy and Environmental Protection (DEEP) and the Connecticut Division of Emergency Management and Homeland Security (DEMHS).

Most communities are active in regional organizations such as CRCOG, the Connecticut Conference of Municipalities (CCM), and the Connecticut Council of Small Towns (COST) which provide a variety of services such as management and technical assistance, training, coordination among various agencies, lobbying for changes in state legislation; use of shared resources; and negotiating for competitive contracts for a variety of goods and services. These organizations can help improve the effectiveness of many local efforts including hazard mitigation.

State Infrastructure

When the initial plan was developed, most Capitol Region municipalities identified stormwater management as a high priority natural hazard mitigation concern. This concern continues. Many communities have specific locations subject to periodic flooding that result from state road drainage systems. Resolving minor flooding problems on state roads is difficult for towns because they have no purview over improvements on state infrastructure. Some such flooding areas pose emergency access risks, while others present minor property damage concerns. Several towns also identified difficulties with the State's response to storm, snow and accident clean-up on state roads.

In the aftermath of the two storms of 2011, Irene and Alfred, the Governor appointed a Two Storm Panel to review how the storms were handled and to make recommendations for future disaster preparedness and response. Among the Panel's recommendations were a number calling for improvements in state infrastructure and disaster preparedness including developing "new engineering standards that will better protect the built environment from the effects of extreme weather," improved GIS mapping and analysis, and planning for the issues rising sea levels will have on combined sewer overflows and dam safety.

Vulnerability to Power Outages

The widespread and lengthy power outages resulting from downed wires and damages to transmission lines due to Irene and the October snowstorm in 2011 brought attention to the need for tree maintenance in utility rights of way and along roadways and the need for better coordination and communication between Connecticut Light & Power (CL&P) and municipal officials. Among the Two Storm Panel's recommendations were calls for improved coordination among electric and telecommunications utilities, municipalities and state agencies in dealing with tree maintenance; a comprehensive study of the feasibility, cost and reliability of undergrounding utilities; and the establishment of a state working group to improve municipal and utility collaborations.

Clean Water Project

The Metropolitan District Commission (MDC) provides water supply, water pollution control, mapping, and household hazardous waste collection to eight member municipalities -- Bloomfield, East Hartford, Hartford, Newington, Rocky Hill, West Hartford, Wethersfield and Windsor. The MDC also provides water and/or sewer services to portions of several other towns in the region. The MDC has undertaken its Clean Water Project in response to both federal and state consent orders to achieve Federal Clean Water Act goals by 2020. The project, estimated at $2.1 billion, will reduce Combined Sewer Overflows (CSO), eliminate Sanitary Sewer Overflows (SSO) and increase Nitrogen removal from system discharges. The challenge, and significant opportunity, presented by the Clean Water Project is for the MDC and its member municipalities to ensure that the design of infrastructure improvements reduces or at least, does not increase, flooding risks. Because the MDC is pursuing funding for the project from several state and federal sources, FEMA Hazard Mitigation program funding is not a likely source of funding (federal funds cannot be used to match other federal funds). Nevertheless, it is important for MDC municipalities to remain active participants in Clean Water Project planning.

Regional Goals, Objectives and Strategic Actions

Review of 2008 Regional Strategy

In developing the Capitol Region's 2008 Pre-Disaster Natural Hazards Mitigation Plan, a single overarching goal of "Minimizing the loss of life and property, and economic disruptions that can result from natural hazards" was proposed to guide regional efforts in natural hazard mitigation. Four objectives and a number of mitigation strategies that were judged to be best addressed on a regional level were identified as means to accomplish this goal. Some are common objectives and actions which might be better addressed on a regional level to maximize efficiency, while others are objectives specific to CRCOG as coordinator of this planning process. The lead agency, or agencies, responsible for implementing specific tasks is listed; however, one can expect supporting agencies to assist in implementation. The regional goal, objectives and strategies were reexamined in the course of this 2014-2019 update to the plan. What follows is a status report on the 2008 Regional Mitigation Strategy and a presentation of revisions and new proposals for the 2014-2019 Plan Update. For a description of how strategies were prioritized both for the Region and individual municipalities, please see Section IV: The Planning Process.

Goal: Minimize the loss of life and property, and economic disruptions that can result from natural hazards.

(No change to this goal is proposed.)

Objective 1: Improve stormwater management throughout the region to prevent increased flooding and lessen the effects of drought.

Discussion: The Capitol Region Council of Governments partnered with the U.S. Environmental Protection Agency to sponsor the development of guidelines local municipalities can use to plan and design sustainable development (*Smart Growth Guidelines for Sustainable Design & Development*, by Jonathon Rose Companies, LLC and Wallace Roberts and Todd, 2009.) These guidelines encourage incorporation of green infrastructure and low impact development (LID) into development and the avoidance of development in floodplains, wetlands and other environmentally sensitive areas. These guidelines were presented to local officials at a widely attended workshop in May 2009.

As a follow up to this work, CRCOG partnered with the U.S. EPA and the Town of Manchester to develop, *From Grey to Green: Sustainable Practices for Redeveloping a Vacant Shopping Center*, by Wallace Roberts & Todd, LLC. This document describes green practices for stormwater management which can be applied to redevelopment projects. This work was presented to local officials at a widely attended workshop in January 2010.

At the planning committee workshop on regional mitigation strategies held February 19, 2013, it was pointed out that use of sanitary sewers in areas served by wells can be disruptive to the water cycle. After discussion, attendees agreed to revise the objective statement to also refer to ground water recharge.

A revision to this objective is proposed:

<u>Objective 1:</u> Improve stormwater management and ground water recharge throughout the region to prevent increased flooding and lessen the effects of drought.

<u>Strategic Actions:</u>

1.1 Encourage all municipalities in the Region to adopt regulations that incorporate or refer to recommended practices from the most current Connecticut Stormwater Quality Manual and *Connecticut Guidelines for Erosion and Sedimentation Control*.

Lead: Capitol Region Council of Governments
Priority: High
Status: CRCOG has made presentations to the Regional Planning Commission (comprised of representatives from local planning and zoning commissions), the Connecticut River Assembly and encouraged municipalities to address stormwater management using green infrastructure and low impact development techniques through the development and dissemination of *<u>Smart Growth Guidelines for Sustainable Design & Development</u>* and *<u>From Grey to Green: Sustainable Practices for Redeveloping a Vacant Shopping Center.</u>* The practices recommended in these documents are in harmony with the *Connecticut Stormwater Quality Manual* and *Connecticut Guidelines for Erosion and Sedimentation Control*. (In 2011, DEEP developed a Low Impact Development Appendices to the Manual and Guidelines.) We recommend continuing to encourage municipal adoption of sound stormwater, erosion control and low impact development regulations and practices.

<u>Proposed Changes</u>: Modify the strategy statement

1.1 Encourage all municipalities in the Region to adopt regulations that incorporate or refer to recommended practices from the most current <u>Connecticut Stormwater Quality Manual</u>, <u>Connecticut Guidelines for Erosion and Sedimentation Control</u> and in particular, those which promote low impact development and green infrastructure techniques.

1.2 Encourage development that is in harmony with natural drainage systems in all municipalities through reviews of development referrals.

Lead: Capitol Region Council of Governments
Priority: Medium
Status: For the last several years, CRCOG staff has routinely encouraged local officials to consider the Smart Growth Guidelines in our reviews of development referrals. We recommend continuing this practice.

<u>Proposed Changes</u>: No change proposed.

1.3 Minimize conflicts between inland wetlands commissions and municipal staff over maintenance of natural drainage channels through education.

Lead: Capitol Region Council of Governments and Municipalities
Priority: Medium
Status: CRCOG did not undertake any direct action related to this strategy over the past five years, however, CRCOG has encouraged municipal participation in NEMO (Nonpoint Education for Municipal Officials) and Land Use Academy training programs offered by the Center for Land Use Education and Research (CLEAR) by notifying local planners of upcoming opportunities. We recommend continuing to encourage local officials to participate in available educational opportunities.
Discussion: At the planning committee workshop on regional mitigation strategies held February 19, 2013, it was suggested that principles of sound stream management should also be addressed.

***Proposed Changes*: Modify the strategy statement.**

1.3 Foster improved understanding of the importance stream management, maintenance of natural drainage channels, and use of green infrastructure practices among municipal staff, inland wetlands commissions and planning and zoning commissions through education.

New Strategic Action:

1.4 Continue participation with other regional planning agencies in Connecticut and Massachusetts in the Connecticut River Bi-State Partnership and, in particular, in the development of a Connecticut River Bi-State Corridor Management Plan.

Lead: Capitol Region Council of Governments in partnership with the Lower Connecticut River Valley Council of Governments, Pioneer Valley Planning Commission and Franklin Regional Council of Governments
Priority: Medium
Discussion: Over the past several years CRCOG has been working cooperatively with other regional planning agencies in Connecticut and Massachusetts which serve communities along the Connecticut River to collaborate to improve the environment, water quality, recreation and public access along the Connecticut River. One proposed activity of this Partnership is the development of a Corridor Management Plan which will address, among other issues, flooding and flood control, stormwater management and erosion and sedimentation control, flood plain protection, and water quality and supply issues.

Objective 2: Assist municipalities in implementing hazard mitigation strategies.

(No change to objective is proposed.)

Discussion: CRCOG believes strongly in preparing for and working to minimize losses to life and property from natural disasters and will continue to work with our member municipalities to strengthen their resiliency.

Strategic Actions:

2.1 Work with member municipalities to maintain this regional pre-disaster natural hazard mitigation plan with updates at least every five years.

Lead: Capitol Region Council of Governments
Priority: High
Status: CRCOG sought FEMA funding and municipal participation to update this plan. We are currently working with the thirty municipalities in the Capitol Region to update the Natural Hazards Mitigation Plan. We recommend continuing this effort.

Proposed Changes: No change proposed (except to remove word pre-disaster per FEMA review).

2.1 Work with member municipalities to maintain this regional natural hazard mitigation plan with updates at least every five years.

2.2 Work with member municipalities, state and federal agencies to improve availability of relevant data; including, but not limited to current land uses, vulnerable building stock inventories and values.

Lead: Capitol Region Council of Governments
Priority: High
Status: As part of the update to the Capitol Region Natural Hazards Mitigation Plan, we are working to update this information. CRCOG also periodically works with municipalities to update regional databases on current municipal land uses and to share Census data releases and analyses. We recommend continuing this effort.
Discussion: At the planning committee workshop on regional mitigation strategies held February 19, 2013, it was suggested that data on hazardous materials inventories also be updated.

Proposed Changes: Modify the strategy statement.

2.2 Work with member municipalities, state and federal agencies to improve availability of relevant data; including, but not limited to current land uses, vulnerable building stock inventories and values, and hazardous materials inventories.

2.3 *Train CRCOG staff in HAZUS-MH software.*

Lead: Capitol Region Council of Governments
Priority: Medium
Status: As part of the update to the Capitol Region Natural Hazards Mitigation Plan, CRCOG staff undertook online training on Hazus-MH and contacted other Hazus users and help-lines for technical support. We recommend training be an ongoing effort.

Proposed Changes: No change proposed.

2.4 Assist member municipalities in pursuing federal and state funds to implement mitigation measures.

Lead: Capitol Region Council of Governments
Priority: Medium
Status: When CRCOG receives notices of funding opportunities, we disseminate this information to municipal officials. CRCOG also writes letters of support on behalf of municipalities for grant applications. CRCOG staff attended a FEMA training course on natural hazard mitigation grant programs. We recommend these efforts continue.

***Proposed Changes*: Revise priority to High.**

2.5 Incorporate natural hazard mitigation concerns into regional plan.

Lead: Capitol Region Council of Governments
Priority: High
Status: The Capitol Region's regional plan of Conservation and Development, *Achieving the Balance*, is currently being updated and references have been incorporated into the draft to address natural hazard mitigation concerns. We recommend this strategy be retained.

***Proposed Changes*: Modify the strategy statement**

2.5 Incorporate natural hazard mitigation concerns into the regional plan of conservation and development and encourage municipalities to address natural hazards mitigation in local plans of conservation and development.

New Strategic Actions:

2.6 Encourage municipalities to participate in the National Flood Insurance Program's Community Rating System.

Lead: Capitol Region Council of Governments
Priority: Medium
Discussion: Discounts on flood insurance premiums are available to those in communities that participate in the NFIP's CRS program. Currently, only West Hartford participates in the CRS. To encourage greater participation, CRCOG could provide information to and arrange an educational workshop on the Community Rating System to be conducted by NFIP and presented to member municipalities. In the 2008 Plan, a number of communities identified investigating participation in the CRS program but were unable to advance this effort significantly. The limited progress made was generally due to constraints on the municipalities' ability to commit personnel to fully explore the program and its impact on and relevance to the community. Eight communities (Granby, Hartford, Simsbury, Somers, South Windsor, Vernon, Wethersfield and Windsor) expressed an interest in undertaking this activity in the 2014-2019 planning period. CRCOG hopes that by assisting these communities, as well as others, through passing on notices of FEMA sponsored training opportunities and arranging for a local workshop, we can give added impetus to these efforts.

2.7 Work with municipalities to facilitate a process for improved communications with upstream communities to provide timely downstream notifications regarding water levels and releases from dams.

Lead: Capitol Region Council of Governments
Priority: High
Discussion: Several communities observed that they do not receive routine notifications of rising water levels at dams in upstream communities. Although owners of dams in Connecticut are required to issue warnings to local emergency management and executive officials, officials in communities further downstream may not receive such warnings. Also, there does not appear to be an established communication process for local Connecticut officials to be notified of rising levels at Massachusetts dams. CRCOG could investigate means to improve the communications regarding notifications to downstream communities.

2.8 Encourage municipalities to increase their citizens' awareness and use of the Get Ready Capitol Region website. (http://www.getreadycapitolregion.org/)

Lead: Capitol Region Council of Governments
Priority: Medium
Discussion: The Public Safety Division of CRCOG recently launched a website which provides emergency preparedness information for local residents. Support of the Get Ready Capitol Region website will increase its effectiveness and help to make the region as a whole more resilient to disasters.

2.9 Encourage FEMA to recognize the cumulative effect of winter storm events.

Lead: Capitol Region Council of Governments
Priority: Medium
Discussion: At the planning committee workshop on regional mitigation strategies held February 19, 2013, it was suggested that efforts should be made to lobby FEMA for recognition of winter storm events as a cumulative natural hazard.

2.10 Assist member communities in efforts to develop and maintain lists of functional needs populations and in improving involvement of functional needs persons in planning and training for hazard mitigation.

Lead: Capitol Region Council of Governments, CREPC RESF-19
Priority: High
Potential Funding Sources: CRCOG operating budget
Timeframe: 2014-2018

<u>Objective 3:</u> Assist municipalities in minimizing risks associated with power disruptions.

(No change to this objective is proposed.)

Discussion: In response to the significant loss of power experienced throughout Connecticut as a result of 2011's Tropical Storm Irene and Winter Storm Alfred, the Governor convened a panel to review the State's approach to the prevention, planning and mitigation of impacts associated with major disasters. The panel issued a report in early 2012 (known as the Two Storm Panel Report) which made a number of recommendations related to utility issues involving tree trimming, infrastructure hardening and communications and information sharing between utilities and municipalities. These recommendations generally recognize that it is the utilities, various state agencies and municipalities which have the direct responsibility for preparing for and responding to power disruptions. The recommendations call for greater cooperation and communication among the utilities, state agencies and municipalities. CRCOG's role can be supportive of state and local efforts to foster a cooperative and coordinated approach to preparing for and dealing with power disruptions.

<u>Strategic Actions:</u>

3.1 Assist municipalities in working with Connecticut Light & Power concerns over appropriate utility right-of-way maintenance, emergency response and the burial of transmission lines.

Lead: Capitol Region Council of Governments
Priority: Medium
Status: A CRCOG representative participates in a utilities working group established by the Connecticut Division of Emergency Management and Homeland Security. We recommend the strategy be modified to reflect actual practices.

<u>Proposed Changes</u>: Modify the strategy statement

3.1 Monitor state efforts to assist municipalities in working with Connecticut Light & Power concerns over appropriate utility right-of-way maintenance, emergency response and the burial of transmission lines.

3.2 Encourage the installation of generators in age-restricted developments with communal facilities through development referrals and associated work with local officials.

Lead: Capitol Region Council of Governments
Priority: Medium
Status: Since 2008, the market for age-restricted developments has decreased and CRCOG has not seen referrals of zone regulation or map changes for such developments. During our meetings with municipal officials to update this plan, the need for generators at nursing and group homes to allow residents to shelter in place was discussed. Because development proposals for nursing homes, group homes and similar facilities are not generally referred to CRCOG for review and comment, efforts to encourage installation of generators at such facilities is a matter best handled at the local level with regional support as needed. Further, with the advent of FEMA's policy of funding generators for critical facilities,

it was proposed that the strategy statement be modified to include CRCOG support for municipal efforts to obtain funding for generators for critical municipal facilities.

Proposed Changes: ***Modify the strategy statement***

3.3 ***Encourage the installation of generators at critical facilities and in developments serving the elderly or special need populations through outreach and associated work with local officials.***

Lead: Capitol Region Council of Governments and Municipalities
Priority: Medium

Objective 4: Assist municipalities in minimizing risks associated with droughts.

(No change to this objective is proposed.)

Discussion: Although the Capitol Region has not experienced a prolonged or severe drought in recent years, this remains a potentially significant natural hazard for member municipalities. Public utilities serve over 80% of the housing units in the Capitol Region. Regional and local water utility companies and local health officials are better equipped for addressing the impacts of and responding to droughts, however, CRCOG could provide a supportive role.

Strategic Actions:

4.1 Assist municipalities that do not currently have drought ordinances in enacting such ordinances to enable the enforcement of water conservation.

Lead: Capitol Region Council of Governments
Priority: Medium
Status: CRCOG did not undertake any direct action related to this strategy over the past five years, however, we will provide information to any municipality that requests our assistance.

Proposed Changes: ***Revise priority to Low***

4.2 Encourage municipalities to disseminate drought-related information released by the CT Division of Emergency Management and Homeland Security or CT Department of Public Health through their websites and/or newsletters.

Lead: Capitol Region Council of Governments
Priority: Medium
Status: CRCOG did not undertake any direct action related to this strategy over the past five years, however, we can post notices and advice to residents on the Get Ready Capitol Region website.

Proposed Changes: ***Modify the strategy statement and revise priority to Low***

4.2 Assist in disseminating drought-related information by encouraging municipalities to post drought-related information released by the Connecticut Division of Emergency Management and Homeland Security or Connecticut Department of Public Health through their websites and/or newsletter, and by posting drought-related information on the Get Ready Capitol Region website.

The Capitol Region's Proposed Mitigation Strategy for the 2014-2019 Natural Hazards Mitigation Plan
Regional Activities

Goal: Minimize the loss of life and property, and economic disruptions that can result from natural hazards.

Objective 1: Improve stormwater management and ground water recharge throughout the region to prevent increased flooding and lessen the effects of drought.

Mitigation Actions:

1.1 Encourage all municipalities in the Region to adopt regulations that incorporate or refer to recommended practices from the most current Connecticut Stormwater Quality Manual, Connecticut Guidelines for Erosion and Sedimentation Control and in particular, those which promote low impact development and green infrastructure techniques.
Lead: Capitol Region Council of Governments
Priority: High
Potential Funding Sources: CRCOG operating budget, future grant
Timeframe: During monthly zoning/development referral process with more comprehensive outreach efforts to be considered during the five-year term of the plan (2014-2019).

1.2 Encourage development that is in harmony with natural drainage systems in all municipalities through reviews of development referrals.
Lead: Capitol Region Council of Governments
Priority: Medium
Potential Funding Sources: CRCOG operating budget
Timeframe: Reviews are done on a monthly basis and will continue throughout the 2014-2019 plan period.

1.3 Foster improved understanding of the importance stream management, maintenance of natural drainage channels, and use of green infrastructure practices among municipal staff, inland wetlands commissions and planning and zoning commissions through education.
Lead: Capitol Region Council of Governments and Municipalities
Priority: Medium
Potential Funding Sources: CRCOG operating budget
Timeframe: Outreach to commissions will be conducted on an annual or more frequent basis as programs become available throughout the 2014-2019 plan period.

1.4 Continue participation with other regional planning agencies in Connecticut and Massachusetts in the Connecticut River Bi-State Partnership and, in particular, in the development of a Connecticut River Bi-State Corridor Management Plan.
Lead: Capitol Region Council of Governments in partnership with the Lower Connecticut River Valley Council of Governments, Pioneer Valley Planning Commission and Franklin Regional Council of Governments
Priority: Medium
Potential Funding Sources: CRCOG operating budget
Timeframe: This is an established process. Partnership members meet several times a year and this practice is expected to continue throughout the 2014-2019 plan period.

Objective 2: Assist municipalities in implementing hazard mitigation strategies.

Mitigation Actions:

2.1 Work with member municipalities to maintain this regional natural hazard mitigation plan with updates at least every five years.
Lead: Capitol Region Council of Governments
Priority: High
Potential Funding Sources: FEMA grant, local and regional resources
Timeframe: We will seek annual status updates from local communities during the 2014-2019 planning period. We will seek FEMA grant funding through the State for the next update beginning in the fall of 2015 if such program funding is available.

2.2 Work with member municipalities, state and federal agencies to improve availability of relevant data; including, but not limited to current land uses, vulnerable building stock inventories and values, and hazardous materials inventories.
Lead: Capitol Region Council of Governments
Priority: High
Potential Funding Sources: CRCOG operating budget, additional sources may need to be sought
Timeframe: 2014-2019

2.3 Train CRCOG staff in HAZUS-MH software.
Lead: Capitol Region Council of Governments
Priority: Medium
Potential Funding Sources: Will seek training through FEMA's Emergency Management Institute (EMI) with sponsorship through CT DEEP
Timeframe: We will pursue training opportunities during the 2014-2019 planning period.

2.4 Assist member municipalities in pursuing federal and state funds to implement mitigation measures.
Lead: Capitol Region Council of Governments
Priority: High
Potential Funding Sources: CRCOG operating budget
Timeframe: Throughout the 2014 – 2019 planning period as grant application opportunities become available.

2.5 Incorporate natural hazard mitigation concerns into the regional plan of conservation and development and encourage municipalities to address natural hazards mitigation in local plans of conservation and development.
Lead: Capitol Region Council of Governments
Priority: High
Potential Funding Sources: CRCOG operating budget
Timeframe: 2014 for regional plan; during referral process throughout the 2014-2019 plan period for municipal plans.

2.6 Encourage municipalities to participate in the National Flood Insurance Program's Community Rating System.
Lead: Capitol Region Council of Governments
Priority: Medium
Potential Funding Sources: CRCOG operating budget with cooperation from FEMA and CT DEEP
Timeframe: A workshop to be organized by the end of 2014

2.7 Work with municipalities to facilitate a process for improved communications with upstream communities to provide timely downstream notifications regarding water levels and releases from dams.
Lead: Capitol Region Council of Governments
Priority: High
Potential Funding Sources: CRCOG operating budget with cooperation from CT DEEP
Timeframe: 2014-2019

2.8 Encourage municipalities to increase their citizens' awareness and use of the Get Ready Capitol Region website. (http://www.getreadycapitolregion.org/)
Lead: Capitol Region Council of Governments
Priority: Medium
Potential Funding Sources: CRCOG operating budget
Timeframe: Periodic reminders throughout the 2014 – 2019 planning period.

2.9 Encourage FEMA to recognize the cumulative effect of winter storm events.
Lead: Capitol Region Council of Governments
Priority: Medium
Potential Funding Sources: CRCOG operating budget
Timeframe: 2014-2019

2.10 Assist member communities in efforts to develop and maintain lists of functional needs populations and in improving involvement of functional needs persons in planning and training for hazard mitigation.
Lead: Capitol Region Council of Governments, CREPC RESF-19
Priority: High
Potential Funding Sources: CRCOG operating budget
Timeframe: 2014-2019

Objective 3: Assist municipalities in minimizing risks associated with power disruptions.

Mitigation Actions:

3.1 Monitor state efforts to assist municipalities in working with Connecticut Light & Power concerns over appropriate utility right-of-way maintenance, emergency response and the burial of transmission lines.
Lead: Capitol Region Council of Governments
Priority: Medium
Potential Funding Sources: CRCOG operating budget
Timeframe: A CRCOG representative will participate in meetings of the ESF-12 utilities working group established by the Connecticut Division of Emergency Management and Homeland Security throughout the 2014-2019 plan period.

3.2 Encourage the installation of generators at critical facilities and in developments serving the elderly or special need populations through outreach and associated work with local officials.
Lead: Capitol Region Council of Governments
Priority: Medium
Potential Funding Sources: CRCOG operating budget
Timeframe: 2014-2019

Objective 4: Assist municipalities in minimizing risks associated with droughts.

Mitigation Actions:

4.1 Assist municipalities that do not currently have drought ordinances in enacting such ordinances to enable the enforcement of water conservation.
Lead: Capitol Region Council of Governments
Priority: Low
Potential Funding Sources: CRCOG operating budget
Timeframe: On an as requested basis; we do not anticipate more than one request during the term of this plan (2014-2019).

4.2 Assist in disseminating drought-related information by encouraging municipalities to post drought-related information released by the Connecticut Division of Emergency Management and Homeland Security or Connecticut Department of Public Health through their websites and/or newsletters, and by posting drought-related information on the Get Ready Capitol Region website.
Lead: Capitol Region Council of Governments
Priority: Low
Potential Funding Sources: CRCOG operating budget
Timeframe: Periodically as warranted throughout the 2014-2019 plan period.

Municipal Goals, Objectives and Strategic Actions

The thirty municipalities in the Capitol Region collectively identified over 400 mitigation strategies to include in this plan update. While many are unique to the individual communities, there are commonalities among the actions proposed and all communities have proposed a range of activities including public education and awareness; natural resource protection; plans, studies and regulatory actions; structural projects and modifications to buildings, facilities and infrastructure; as well as measures to improve preparedness and emergency response. Most activities proposed in this Plan Update are not exclusive to this document. Some activities such as strengthening and enforcing regulations, and public outreach efforts, are routine, long term, sustained activities and established practices and procedures which will be conducted with an additional emphasis on hazard mitigation. Others are projects which may have also been previously identified in capital improvements programs, annual budgets, and various local plans. Other activities have been newly identified as a result of this planning effort. A blueprint for implementing all proposed projects in this Plan Update has been provided: departments and agencies which will be responsible for carrying out the activities, potential funding sources, and the time frames for conducting the projects have been identified for each mitigation activity. In the course of this update process, municipal officials evaluated progress made on the mitigation activities proposed in the 2008 Plan. From this effort, insights into means in which to ensure project implementation were gained. The tables below summarize and categorize these activities. The individual municipal sections which follow in the next chapter provide additional details on these activities and how they will be implemented. This Plan helps to focus attention on efforts that can reduce or eliminate the long-term risk to human life or property from natural hazards; however, there are no mandates to undertake these specific activities. The mitigation strategies that follow focus on actions that can be achieved within the 5 year plan period although some activities/projects may require a longer timeframe to be fully implemented. The availability of resources to fund and carry out these activities is crucial to their successful implementation.

We categorized the individual projects and actions proposed by the municipalities into the following types of measures:

Education & Awareness – Projects and actions in this category include measures to inform and educate local residents and businesses, elected and appointed officials, and other stakeholders. Types of outreach include general public informational outreach efforts such as use of local websites to post information, mailings with tax statements, newspaper advertisements, press releases, e-mail blasts, etc. Other measures in this category include targeted outreach efforts to specific groups which could include more direct contact such as meetings. Also included are workshops, forums, fairs, seminars and the like.

Natural Resource Protection – Actions included in this category are those that not only minimize hazard losses but also can preserve or restore functions of natural systems such as stream corridor restoration, watershed management, wetlands preservation and restoration, and timber management.

Preparedness and Enhancement of Emergency Response – Actions in this category may not be thought of as directly tied to mitigation of damage due to natural disasters but they are measures vital to public safety and the restoration of normalcy in a community. In this regard, they play an important role in the reduction of losses a community will experience. Measures in this category include improving working relationships and coordination

between agencies; securing new equipment, facilities, supplies and personnel to aid in emergency response; improving procedures related to emergency response; conducting emergency response training; and improving communications systems.

Prevention – Activities in this category generally include government actions or processes that influence the way land and buildings are developed, such as zoning regulations, floodplain regulations, building codes, open space preservation, and stormwater regulations. Also included are studies and assessments of risks and vulnerabilities including identifying and improving a community's ability to contact vulnerable populations; improving mapping and data analysis capabilities; and undertaking engineering studies to address drainage, flooding, and power outage issues. Other government actions and programs such as implementing procedures for improving operations, using tax incentives and capital improvement programming are also included in this category.

Structural Projects/Property Protection & Modifications – Activities in this category include modifications and retrofits of existing buildings, structures and infrastructure to protect or remove them from harm such as acquisition, relocation, elevation, flood proofing, installation of shatter proof glass, relining culverts, strengthening roofs, etc. Measures in this category could also include new construction or reconstruction projects to reduce the impact of hazards such as installation of improved drainage facilities, culverts, and other stormwater controls as well as undergrounding utilities. Expanding sheltering capacity and installation of backup power to critical facilities are other measures included in this category.

It should be noted that a number of specific measures could be classified into one or more of these types/categories. For the purposes of this planning effort, we chose to identify specific measures as being within only one of these categories.

Table 22 on the following page summarizes which municipalities have proposed measures in each of these categories. As can be seen, all communities have proposed a variety of actions to mitigate the damages natural hazards can cause. Most communities have proposed to undertake one or more public education/outreach project and one or more projects aimed at improving emergency preparedness and response. Most communities have also proposed to undertake structural projects to construct, modify, or relocate buildings, infrastructure, or critical facilities in order to strengthen them or protect them or their functions from the effects of natural disasters. All communities have proposed one or more activities designed to prevent or lessen the impacts of natural hazards. A number of communities, mostly rural, have proposed projects designed to protect or restore natural resources or natural functions.

Following this summary table is a listing by municipality of each mitigation action proposed in the 2008 Plan and in this Update (Table 23). For the actions which will be initiated or undertaken over the next five years, local priorities and a planning level benefit cost ratio also have been identified. The means in which priorities and benefit cost ratios were developed is explained in the Analysis of Mitigation Actions and Processes section which follows Table 23. Details of each proposed local mitigation activity or project including responsible agencies, project priorities, project statuses, potential funding sources, and anticipated timeframes, are provided in Section IV: Municipal Plans.

Table 22: Summary of Types of Mitigation Projects Proposed by Community

	Education & Awareness			Natural Resource Protection		Preparedness (Enhance Emergency Response)					Prevention				Structural Projects – Property Protection & Modifications			
Municipal Strategic Mitigation Actions, Processes, Projects	Informational Public Outreach	Targeted Outreach	Workshops and Forums	Preserve & Restore Natural Functions	Timber Management	Improve Coordination & Working Relationships	Improve Procedures	New Facilities, Equipment, Supplies, Personnel	Training	Improve Communications Systems	Assess Risks & Vulnerabilities	Assess/Protect Vulnerable Populations	Processes to Mitigate Damages to Life & Property	Strengthen Planning & Development Regulations	Acquisition/Relocation	Improve Drainage, Culverts, Roads & Bridges	Protect/Improve Utility Infrastructure	Strengthen/Protect Critical Facilities
Andover	X	X				X		X	X	X		X	X					X
Avon	X					X	X		X	X	X		X	X				X
Bloomfield	X							X	X	X			X			X		
Bolton	X			X		X				X	X		X			X	X	
Canton	X					X					X	X	X	X	X			
East Granby				X			X			X	X	X	X	X				
East Hartford	X		X						X	X	X	X	X			X		X
East Windsor	X			X		X		X	X		X	X	X			X		X
Ellington	X	X										X	X	X		X		X
Enfield	X							X		X	X	X	X	X		X		X
Farmington	X										X		X			X		X
Glastonbury	X							X				X	X	X		X	X	X
Granby	X				X	X	X	X	X		X		X	X		X	X	
Hartford			X						X	X		X	X			X		X
Hebron	X				X	X		X			X	X	X	X				X
Manchester	X	X				X	X				X					X		
Marlborough	X						X	X	X	X	X		X					X
Newington		X				X		X	X				X			X		
Rocky Hill						X	X	X		X			X	X	X	X		X
Simsbury		X				X				X		X	X	X		X		X
Somers	X	X											X	X		X		X
South Windsor	X					X	X	X	X		X	X	X	X			X	X
Stafford	X					X	X	X	X		X		X	X		X	X	
Suffield	X			X							X		X	X				
Tolland	X			X		X		X			X	X	X	X		X		X
Vernon	X	X						X		X	X		X			X		X
West Hartford								X	X				X					X
Wethersfield	X							X	X		X		X	X	X	X	X	X
Windsor	X	X		X			X	X	X		X		X			X	X	X
Windsor Locks	X													X		X		X
Capitol Region	X	X	X	X		X			X		X	X		X				

Table 23: Listing of Municipal Strategic Actions from 2008 Plan and 2014-2019 Plan Update

Municipality	Type of Mitigation Measure	Strategic Action	Status of Action (See Municipal Plans Section for Additional Status Details)	Hazard Addressed*	Priority	Planning Level Benefit-Cost Ratio
Andover	**Education & Awareness - Informational Public Outreach**	Educate the public on new warning notification system, sheltering facilities and other emergency preparedness measures.	Existing Action to be Continued in 2014-2019 Plan Update	All	Medium	4.8
Andover	**Education & Awareness - Informational Public Outreach**	Educate property owners on property maintenance, especially around natural and artificial drainage systems.	Existing 2008 Plan Action - Modified for 2014-19 Update	All, Flood	Medium	4.8
Andover	**Education & Awareness - Targeted Outreach**	Coordinate with pipeline owner on public education and outreach regarding line and public safety.	Existing Action to be Continued in 2014-2019 Plan Update	Other	Low	3.6
Andover	**Preparedness - Enhance Relationships & Coordination to Improve Emergency Response**	Establish a list of, and agreements with, private tree service companies to ensure prompt debris removal service following storms.	Existing Action to be Continued in 2014-2019 Plan Update	Snow, Wind, Flood	Medium	3.4
Andover	**Preparedness - Enhance Emergency Response: New Facilities, Equipment, Supplies, Personnel**	Investigate animal sheltering alternatives.	Existing 2008 Plan Action - Modified for 2014-19 Update	All	Low	1.1
Andover	**Preparedness - Enhance Emergency Response: Training**	Continue to participate in National Incident Management System (NIMS) training.	Existing Action to be Continued in 2014-2019 Plan Update	All	High	4.0
Andover	**Preparedness - Improve Communications Systems**	Monitor implementation of Reverse-911 system, and plan for updates.	Existing Action to be Continued in 2014-2019 Plan Update	All	Medium	1.8
Andover	**Prevention - Assess/Protect Vulnerable Populations**	Coordinate with municipal agent for the elderly on special needs population list maintenance	Existing Action to be Continued in 2014-2019 Plan Update	All	Medium	2.3
Andover	**Prevention - Processes to Mitigate Damages to Life & Property**	Investigate the CRCOG service sharing initiative, especially surrounding tree and other debris removal equipment	Existing Action to be Continued in 2014-2019 Plan Update	Snow, Wind, All	Medium	2.0
Andover	**Prevention - Processes to Mitigate Damages to Life & Property**	Coordinate with DEEP on maintenance of the Andover Lake Dam and of state forest land for structural integrity of dam, wild fire prevention and emergency response.	Existing Action to be Continued in 2014-2019 Plan Update	Dams, Fires	Medium	2.0

Municipality	Type of Mitigation Measure	Strategic Action	Status of Action (See Municipal Plans Section for Additional Status Details)	Hazard Addressed*	Priority	Planning Level Benefit-Cost Ratio
Andover	**Prevention - Processes to Mitigate Damages to Life & Property**	Areas draining into the Hop River will be monitored to identify and prevent future erosion.	Existing 2008 Plan Action - Modified for 2014-19 Update	Flood	Medium	2.0
Andover	**Structural Projects -Strengthen/ Protect Critical Facilities**	Improve shelter facility, especially sanitary facilities, handicapped accessibility and generator.	Existing Action to be Continued in 2014-2019 Plan Update	All	Medium	1.6
Andover	**Prevention - Processes to Mitigate Damages to Life & Property**	Study debris and flooding issues on Parker Bridge Road.	2008 Plan Action – Not to be pursued further by Town	Flood		
Avon	**Education & Awareness - Informational Public Outreach**	Use municipal website and town newsletter to periodically update residents.	Existing Action to be Continued in 2014-2019 Plan Update	All	Medium	4.8
Avon	**Natural Resource Protection - Preserve & Restore Natural Functions**	Ensure that an equal amount of compensation for any project that negatively affects flood flows.	Discontinued Action from 2008 Plan (Covered by another Action)	Flood		
Avon	**Preparedness - Enhance Relationships & Coordination to Improve Emergency Response**	Develop and maintain agreements with local contractors for emergency tree and debris removal, to quickly restore access throughout town, for emergency response.	Existing Action to be Continued in 2014-2019 Plan Update	Snow, Wind, Flood	Medium	3.4
Avon	**Preparedness - Enhance Relationships & Coordination to Improve Emergency Response**	Talk to CT Department of Transportation about using state highway garage as staging area for local personnel.	Existing Action to be Continued in 2014-2019 Plan Update	All	High	3.4
Avon	**Preparedness - Enhance Relationships & Coordination to Improve Emergency Response**	Meet with MDC staff to discuss coordinated emergency response planning.	Existing Action to be Continued in 2014-2019 Plan Update	All	Medium	3.4
Avon	**Preparedness - Enhance Relationships & Coordination to Improve Emergency Response**	Coordinate with other agencies on an as needed basis.	Existing Action to be Continued in 2014-2019 Plan Update	All	Low	3.4
Avon	**Preparedness - Enhance Emergency Response Procedures**	Fully implement new fleet management system.	Completed Action from 2008 Plan	All	High	2.8
Avon	**Preparedness - Enhance Emergency Response Procedures**	Continue with current practices of relocating personnel to the East side of the Farmington River as needed.	Existing Action to be Continued in 2014-2019 Plan Update	Flood	High	2.8
Avon	**Preparedness - Enhance Emergency Response: Training**	Continue to participate in regional National Incident Management System (NIMS) and	Existing Action to be Continued in 2014-2019 Plan Update	All	High	4.0

Municipality	Type of Mitigation Measure	Strategic Action	Status of Action (See Municipal Plans Section for Additional Status Details)	Hazard Addressed*	Priority	Planning Level Benefit-Cost Ratio
		other emergency response trainings.				
Avon	**Preparedness - Enhance Emergency Response: Training**	Inform municipal staff of revisions to emergency response action plan.	Existing Action to be Continued in 2014-2019 Plan Update	All	High	4.0
Avon	**Preparedness - Improve Communications Systems**	Provide satellite televisions for Public Works and Fire Departments to monitor information when power and cable are out.	Completed Action from 2008 Plan	All		
Avon	**Preparedness - Improve Communications Systems**	Upgrade more staff members to wireless communication systems.	Completed Action from 2008 Plan	All		
Avon	**Prevention - Assess Risks & Vulnerabilities**	Map structures located in floodplains, and develop a targeted Reverse-911 list for those property owners.	Existing Action to be Continued in 2014-2019 Plan Update	Flood	Low	1.9
Avon	**Prevention - Assess Risks & Vulnerabilities**	Map, or obtain mapping of, MDC infrastructure in town.	Existing Action to be Continued in 2014-2019 Plan Update	All	Low	1.9
Avon	**Prevention - Processes to Mitigate Damages to Life & Property**	Investigate CRCOG services sharing initiative, and potential for shared equipment, such as a chipper.	Completed Action from 2008 Plan	All		
Avon	**Prevention - Processes to Mitigate Damages to Life & Property**	Implement web-based GIS, and provide access to sensitive information for emergency responders.	Completed Action from 2008 Plan	All		
Avon	**Prevention - Strengthen Planning & Development Regulations**	Continue with current practices to enforce floodplain regulations.	Existing Action to be Continued in 2014-2019 Plan Update	Flood	High	1.8
Avon	**Structural Projects -Strengthen/ Protect Critical Facilities**	Acquire a portable generator and enable hook-ups at shelters and emergency response facilities.	Existing Action to be Continued in 2014-2019 Plan Update	All	Low	1.6
Bloomfield	**Education & Awareness - Informational Public Outreach**	Encourage property owners to maintain and clear debris from stream channels.	Existing Action to be Continued in 2014-2019 Plan Update	Flood	Medium	4.8
Bloomfield	**Preparedness - Enhance Emergency Response: New Facilities, Equipment, Supplies, Personnel**	Ensure public works has adequate facilities and necessary equipment to be responsive various storm types.	Existing 2008 Plan Action - Modified for 2014-19 Update	All	High	1.1

Municipality	Type of Mitigation Measure	Strategic Action	Status of Action (See Municipal Plans Section for Additional Status Details)	Hazard Addressed*	Priority	Planning Level Benefit-Cost Ratio
Bloomfield	**Preparedness - Enhance Emergency Response: Training**	Ensure that all town officials are familiar with emergency preparedness plans.	Existing Action to be Continued in 2014-2019 Plan Update	All	Medium	4.0
Bloomfield	**Preparedness - Improve Communications Systems**	Improve/replace existing Town communication system in favor of one that is more reliable and has better coverage during storm events.	New Initiative	All	Medium	1.8
Bloomfield	**Prevention - Processes to Mitigate Damages to Life & Property**	Improve awareness and encourage flood-proofing for threatened structures.	New Initiative	Flood	Medium	2.0
Bloomfield	**Prevention - Processes to Mitigate Damages to Life & Property**	Further study and pursue protection measures for Town Library.	Existing Action to be Continued in 2014-2019 Plan Update	Flood	Medium	2.0
Bloomfield	**Prevention - Processes to Mitigate Damages to Life & Property**	Conduct a tree and vegetation inventory and develop a maintenance program.	Existing Action to be Continued in 2014-2019 Plan Update	All	Medium	2.0
Bloomfield	**Prevention - Processes to Mitigate Damages to Life & Property**	Continue to explore service sharing arrangements and engage in CRCOG's service sharing initiative.	Existing Action to be Continued in 2014-2019 Plan Update	All	Medium	2.0
Bloomfield	**Structural Projects - Acquisition/ Relocation**	Acquire and demolish house on Tunxis Ave. that regularly experiences flooding.	Discontinued Action from 2008 Plan	Flood		
Bloomfield	**Structural Projects - Improve Drainage, Culverts, Roads & Bridges**	Install storm water drainage on those Town roads where it currently does not exist; and improve/replace inadequate storm water systems that currently do exist.	New Initiative	Flood	Very High	1.3
Bolton	**Education & Awareness - Informational Public Outreach**	Conduct public outreach on safe operation of generators.	Existing Action to be Continued in 2014-2019 Plan Update	All	Medium	4.8
Bolton	**Natural Resource Protection - Preserve & Restore Natural Functions**	Monitor and manage Notch Pond Dam beaver population	New Initiative	Flood	High	1.3
Bolton	**Preparedness - Enhance Relationships & Coordination to Improve Emergency Response**	Continue informal arrangements with private contractors for emergency tree/debris removal.	Existing Action to be Continued in 2014-2019 Plan Update	All	High	3.4

Municipality	Type of Mitigation Measure	Strategic Action	Status of Action (See Municipal Plans Section for Additional Status Details)	Hazard Addressed*	Priority	Planning Level Benefit-Cost Ratio
Bolton	**Preparedness - Enhance Relationships & Coordination to Improve Emergency Response**	Maintain good communications with utility companies.	Existing Action to be Continued in 2014-2019 Plan Update	All	Medium	3.4
Bolton	**Preparedness - Enhance Emergency Response: New Facilities, Equipment, Supplies, Personnel**	Pursue opportunities to increase sheltering capacity.	Completed Action from 2008 Plan	All		
Bolton	**Preparedness - Improve Communications Systems**	Implement new town-wide communications system.	Existing Action to be Continued in 2014-2019 Plan Update	All	High	1.8
Bolton	**Prevention - Assess Risks & Vulnerabilities**	Study Johnson Road culvert/dam and recommend improvements	New Initiative	Flood, Dams	Medium	1.9
Bolton	**Prevention - Assess Risks & Vulnerabilities**	Study Lyman Road culvert associated with Blackledge River and recommend improvements.	Existing Action to be Continued in 2014-2019 Plan Update	Flood	Medium	1.9
Bolton	**Prevention - Assess Risks & Vulnerabilities**	Study School Road culvert associated with Baker Brook and recommend improvements.	Completed Action from 2008 Plan	Flood		
Bolton	**Prevention - Processes to Mitigate Damages to Life & Property**	Develop and implement plan to power residential grinder pumps during prolonged power outages	New Initiative	All	High	2.0
Bolton	**Prevention - Processes to Mitigate Damages to Life & Property**	Monitor and maintain drainage and flood control systems.	Existing Action to be Continued in 2014-2019 Plan Update	Flood	High	2.0
Bolton	**Structural Projects - Improve Drainage, Culverts, Roads & Bridges**	Implement improvements recommended in Johnson Road culvert/dam study.	New Initiative	Flood, Dams	Medium	1.3
Bolton	**Structural Projects - Improve Drainage, Culverts, Roads & Bridges**	Implement improvements recommended in Lyman Road culvert study.	Existing Action to be Continued in 2014-2019 Plan Update	Flood	Medium	1.3
Bolton	**Structural Projects - Improve Drainage, Culverts, Roads & Bridges**	Implement improvements recommended in Baker Brook/School Road study.	Completed Action from 2008 Plan	Flood		
Bolton	**Structural Projects - Protect/ Improve Utility Infrastructure**	Pursue opportunities to update and/or underground transmission lines.	Existing Action to be Continued in 2014-2019 Plan Update	All	Low	0.9

Municipality	Type of Mitigation Measure	Strategic Action	Status of Action (See Municipal Plans Section for Additional Status Details)	Hazard Addressed*	Priority	Planning Level Benefit-Cost Ratio
Canton	**Education & Awareness - Informational Public Outreach**	Educate residents on most common alternative routes in advance of storms through municipal website and other resident communications.	Existing Action to be Continued in 2014-2019 Plan Update	All	Medium	4.8
Canton	**Preparedness - Enhance Relationships & Coordination to Improve Emergency Response**	Maintain good communications with neighboring communities' public safety officials to coordinate road closures and detours.	Existing Action to be Continued in 2014-2019 Plan Update	All	High	3.4
Canton	**Preparedness - Enhance Relationships & Coordination to Improve Emergency Response**	Maintain good communications with Connecticut Light & Power	Existing Action to be Continued in 2014-2019 Plan Update	All	High	3.4
Canton	**Preparedness - Improve Communications Systems**	Enhance town warning system: sirens, public address systems, etc.	Completed Action from 2008 Plan	All	Medium	
Canton	**Prevention - Assess Risks & Vulnerabilities**	Study potential impacts of Nepaug Reservoir Dam failure.	Existing Action to be Continued in 2014-2019 Plan Update	Flood, Dams	Low	1.9
Canton	**Prevention - Assess/Protect Vulnerable Populations**	Develop appropriate evacuation plan based on Nepaug Reservoir Dam failure.	Existing Action to be Continued in 2014-2019 Plan Update	Flood, Dams	Low	2.3
Canton	**Prevention - Assess/Protect Vulnerable Populations**	Develop appropriate evacuation plan based on Barkhamsted Reservoir Dam failure studies.	Existing Action to be Continued in 2014-2019 Plan Update	Flood, Dams	Low	2.3
Canton	**Prevention - Processes to Mitigate Damages to Life & Property**	Maintain flood proofing measures protecting the sewage treatment facility.	Existing Action to be Continued in 2014-2019 Plan Update	Flood	High	2.0
Canton	**Prevention - Strengthen Planning & Development Regulations**	Continue to review and enforce development regulations to prevent increased flood risks.	Existing Action to be Continued in 2014-2019 Plan Update	Flood	High	1.8
Canton	**Structural Projects - Acquisition/ Relocation**	Continue to monitor the availability of an appropriate site for relocating the town garage.	Existing Action to be Continued in 2014-2019 Plan Update	Flood	High	0.9
Canton	**Structural Projects - Acquisition/ Relocation**	Develop a list of private properties for acquisition as they become available at Dowd's Corner.	Existing 2008 Plan Action - Modified for 2014-19 Update	Flood	Medium	0.9
East Granby	**Natural Resource Protection - Preserve & Restore Natural**	Educate land use officials on low impact development techniques.	Existing Action to be Continued in 2014-2019 Plan Update	Flood, Drought	Medium	1.3

Municipality	Type of Mitigation Measure	Strategic Action	Status of Action (See Municipal Plans Section for Additional Status Details)	Hazard Addressed*	Priority	Planning Level Benefit-Cost Ratio
	Functions					
East Granby	**Preparedness - Enhance Emergency Response Procedures**	Implement recommendations from flood access plan.	Existing Action to be Continued in 2014-2019 Plan Update	Flood	Low	2.8
East Granby	**Preparedness - Enhance Emergency Response Procedures**	Treat roads in advance of winter storms, when possible.	Existing Action to be Continued in 2014-2019 Plan Update	Snow	Medium	2.8
East Granby	**Preparedness - Enhance Emergency Response Procedures**	Continue to address state roads, when necessary to maintain safety.	Existing Action to be Continued in 2014-2019 Plan Update	All	Low	2.8
East Granby	**Preparedness - Improve Communications Systems**	Monitor and ensure effective implementation of Reverse-911 system	Existing Action to be Continued in 2014-2019 Plan Update	All	Medium	1.8
East Granby	**Prevention - Assess Risks & Vulnerabilities**	Analyze areas where outages occur and monitor new developments.	Existing Action to be Continued in 2014-2019 Plan Update	All	Medium	1.9
East Granby	**Prevention - Assess/Protect Vulnerable Populations**	Continue to maintain special needs population list.	Existing Action to be Continued in 2014-2019 Plan Update	All	Medium	2.3
East Granby	**Prevention - Processes to Mitigate Damages to Life & Property**	Develop a plan for accessing flood prone areas, such as Winding Hill Road	Existing Action to be Continued in 2014-2019 Plan Update	Flood	Medium	2.0
East Granby	**Prevention - Processes to Mitigate Damages to Life & Property**	Continue tree evaluation practices.	Existing Action to be Continued in 2014-2019 Plan Update	Wind, Snow	Medium	2.0
East Granby	**Prevention - Processes to Mitigate Damages to Life & Property**	Continue to contract out preventive maintenance of trees	Existing Action to be Continued in 2014-2019 Plan Update	Wind, Snow	Medium	2.0
East Granby	**Prevention - Strengthen Planning & Development Regulations**	Consider requiring more low impact development measures through zoning regulations.	Existing Action to be Continued in 2014-2019 Plan Update	Flood, Drought	Medium	1.8
East Granby	**Prevention - Strengthen Planning & Development Regulations**	Develop an open space plan, with special attention paid to land along rivers and streams not only because of flooding concerns, but also for recreation and wildlife management interests.	Existing Action to be Continued in 2014-2019 Plan Update	Flood	Medium	1.8

Municipality	Type of Mitigation Measure	Strategic Action	Status of Action (See Municipal Plans Section for Additional Status Details)	Hazard Addressed*	Priority	Planning Level Benefit-Cost Ratio
East Granby	**Prevention - Strengthen Planning & Development Regulations**	Continue to implement measures under Phase II MS4 Stormwater program.	Existing Action to be Continued in 2014-2019 Plan Update	Flood	High	1.8
East Granby	**Structural Projects - Improve Drainage, Culverts, Roads & Bridges**	Address Floydville Road culvert, either by cleaning or by replacing.	Completed Action from 2008 Plan	Flood	Low	
East Granby	**Structural Projects - Protect/ Improve Utility Infrastructure**	Work with utility to reduce outages in areas frequently without power	Completed Action from 2008 Plan	All	Medium	
East Hartford	**Education & Awareness - Informational Public Outreach**	Implement an educational system for property owners, including insurance education, evacuation strategies and business continuity planning.	Existing Action to be Continued in 2014-2019 Plan Update	Flood	Medium	4.8
East Hartford	**Education & Awareness - Workshops and Forums**	Offer educational forums for residents on personal emergency planning.	Existing Action to be Continued in 2014-2019 Plan Update	All	Medium	3.8
East Hartford	**Preparedness - Enhance Emergency Response: Training**	Train Town employees according to the updated manual in proper flood fighting operation and maintenance techniques.	Existing Action to be Continued in 2014-2019 Plan Update	Flood	Medium	4.0
East Hartford	**Preparedness - Enhance Emergency Response: Training**	Exercise and refine critical components of National Incident Management System with an emphasis on interagency communication and cooperation.	Existing Action to be Continued in 2014-2019 Plan Update	All	High	4.0
East Hartford	**Preparedness - Enhance Emergency Response: Training**	Participate in local, regional and state-wide natural disaster preparedness training.	Existing Action to be Continued in 2014-2019 Plan Update	All	Medium	4.0
East Hartford	**Preparedness - Improve Communications Systems**	Use a public notification system.	Existing Action to be Continued in 2014-2019 Plan Update	All	Medium	1.8
East Hartford	**Preparedness - Improve Communications Systems**	Identify and acquire public notification system, like Reverse-911, for facilitating communication of critical information to residents of all means.	Existing Action to be Continued in 2014-2019 Plan Update	All	Medium	1.8
East Hartford	**Prevention - Assess Risks & Vulnerabilities**	Evaluate the condition and sustainability of existing drainage systems.	Existing Action to be Continued in 2014-2019 Plan Update	Flood	High	1.9

Municipality	Type of Mitigation Measure	Strategic Action	Status of Action (See Municipal Plans Section for Additional Status Details)	Hazard Addressed*	Priority	Planning Level Benefit-Cost Ratio
East Hartford	**Prevention - Assess/Protect Vulnerable Populations**	Develop and maintain an accessible registry of residents with special needs using a regional model	Existing Action to be Continued in 2014-2019 Plan Update	All	High	2.3
East Hartford	**Prevention - Assess/Protect Vulnerable Populations**	Continue training for the evacuation, sheltering and protection of special needs populations.	Existing Action to be Continued in 2014-2019 Plan Update	All	Medium	2.3
East Hartford	**Prevention - Processes to Mitigate Damages to Life & Property**	Continue periodic updates to the flood control system manual as system improvements are completed.	Existing Action to be Continued in 2014-2019 Plan Update	Flood	Medium	2.0
East Hartford	**Prevention - Processes to Mitigate Damages to Life & Property**	Develop a capital improvement plan to improve existing drainage projects.	Existing Action to be Continued in 2014-2019 Plan Update	Flood	High	2.0
East Hartford	**Structural Projects - Improve Drainage, Culverts, Roads & Bridges**	Pursue priority drainage projects identified in capital improvement plan	Existing Action to be Continued in 2014-2019 Plan Update	Flood	High	1.3
East Hartford	**Structural Projects -Strengthen/ Protect Critical Facilities**	Continue to implement necessary repairs and upgrades required by FEMA and the Army Corps of Engineers to retain accreditation	Existing Action to be Continued in 2014-2019 Plan Update	Flood	High	1.6
East Windsor	**Education & Awareness - Informational Public Outreach**	Use town media, including newsletter, website and other means to educate residents on personal planning for emergencies.	Existing Action to be Continued in 2014-2019 Plan Update	All	Medium	4.8
East Windsor	**Natural Resource Protection - Preserve & Restore Natural Functions**	Work with property owners, contractors and the DEEP to regularly remove beaver dams causing flooding problems	Existing Action to be Continued in 2014-2019 Plan Update	Flood	Medium	1.3
East Windsor	**Preparedness - Enhance Relationships & Coordination to Improve Emergency Response**	Continue to use private contractors for emergency debris removal.	Existing Action to be Continued in 2014-2019 Plan Update	Snow, Wind, Flood	Medium	3.4
East Windsor	**Preparedness - Enhance Emergency Response: New Facilities, Equipment, Supplies, Personnel**	Improve the ability to clear roads by increasing public works staff	New Initiative	Snow	High	1.1
East Windsor	**Preparedness - Enhance Emergency Response: New Facilities, Equipment, Supplies, Personnel**	Maintain adequate material for treating roads in newly constructed salt shed.	Existing Action to be Continued in 2014-2019 Plan Update	Snow	Medium	1.1

Municipality	Type of Mitigation Measure	Strategic Action	Status of Action (See Municipal Plans Section for Additional Status Details)	Hazard Addressed*	Priority	Planning Level Benefit-Cost Ratio
East Windsor	**Preparedness - Enhance Emergency Response: Training**	Training and continue to train shelter staff associated with Emergency Management	New Initiative	All	Medium	4.0
East Windsor	**Preparedness - Enhance Emergency Response: Training**	Recruit more volunteers for shelter staff	New Initiative	All	Medium	4.0
East Windsor	**Preparedness - Enhance Emergency Response: Training**	Familiarize town staff with Reverse-911 as system implementation begins.	Existing Action to be Continued in 2014-2019 Plan Update	All	Medium	4.0
East Windsor	**Prevention - Assess Risks & Vulnerabilities**	Conduct study of dam on Main Street near Depot Street intersection, using previously awarded funds.	Existing Action to be Continued in 2014-2019 Plan Update	Dams, Flood	High	1.9
East Windsor	**Prevention - Assess/Protect Vulnerable Populations**	Continue to maintain special needs population lists.	Existing Action to be Continued in 2014-2019 Plan Update	All	High	2.3
East Windsor	**Prevention - Processes to Mitigate Damages to Life & Property**	Obtain service contracts and maintain gen-sets at Police Department, Town Garage, Town Hall, Broad Book Fire, and the Prospect Hill Antenna site	New Initiative	All	High	2.0
East Windsor	**Prevention - Processes to Mitigate Damages to Life & Property**	Continue regular tree maintenance, including documentation and notification of issues in CL&P utility right-of-way	Existing Action to be Continued in 2014-2019 Plan Update	Snow, Wind, Flood	High	2.0
East Windsor	**Prevention - Processes to Mitigate Damages to Life & Property**	Devise and implement a regular building inspection and maintenance program	Existing Action to be Continued in 2014-2019 Plan Update	Wind	Medium	2.0
East Windsor	**Structural Projects - Acquisition/ Relocation**	Investigate and consider purchasing residential properties located in floodplains, as they come up for sale.	Discontinued Action from 2008 Plan (Suspended)	Flood		
East Windsor	**Structural Projects - Improve Drainage, Culverts, Roads & Bridges**	Implement recommendations of Natural Resources Conservation Service, including installation of a detention basin in Windsorville Road/East Road area to reduce road closures and washouts	Existing Action to be Continued in 2014-2019 Plan Update	Flood	Medium	1.3
East Windsor	**Structural Projects - Improve Drainage, Culverts, Roads & Bridges**	Consider replacing East Road and Melrose bridges.	Discontinued Action from 2008 Plan/Completed Project	Flood		

Municipality	Type of Mitigation Measure	Strategic Action	Status of Action (See Municipal Plans Section for Additional Status Details)	Hazard Addressed*	Priority	Planning Level Benefit-Cost Ratio
East Windsor	**Structural Projects -Strengthen/ Protect Critical Facilities**	Obtain funding through grant opportunities and Town appropriation to place new gen-sets in High School, Town Garage (replace), Scout Hall and Broad Brook Middle School.	New Initiative	All	High	1.6
East Windsor	**Structural Projects -Strengthen/ Protect Critical Facilities**	Establish the East Windsor High School as a fully functional emergency shelter: maintain commitment from electrical contractor to supply 60 kw generator in times of mass power outage	New Initiative	All	High	1.6
East Windsor	**Structural Projects -Strengthen/ Protect Critical Facilities**	Implement recommendations from the study of dam on Main Street	Existing Action to be Continued in 2014-2019 Plan Update	Dams, Flood	Medium	1.6
Ellington	**Education & Awareness - Informational Public Outreach**	Educate public on property owners' responsibility to maintain drainage systems	Existing Action to be Continued in 2014-2019 Plan Update	Flood, All	Low	4.8
Ellington	**Education & Awareness - Targeted Outreach**	Encourage private fuel dispensaries to install back-up generator power to ensure continued access to fuel for residential and business transportation, heating/cooling and power needs	New Initiative	All	High	3.6
Ellington	**Prevention - Assess/Protect Vulnerable Populations**	Complete strategic plan for evacuating and sheltering special needs populations with emphasis on sheltering in place for those not able to get to designated shelters (i.e. Snipsic Village Community Building)	Existing 2008 Plan Action - Modified for 2014-19 Update	All	High	2.3
Ellington	**Prevention - Processes to Mitigate Damages to Life & Property**	Work with State DOT to ensure safe/emergency vehicular passage to the Crystal Lake community prior to, during and after storms (Routes 140 and 30)	New Initiative	Flood	High	2.0
Ellington	**Prevention - Strengthen Planning & Development Regulations**	Continue to implement and enforce local building and zoning regulations to prevent development in risk-prone areas	Existing Action to be Continued in 2014-2019 Plan Update	Flood	High	1.8

Municipality	Type of Mitigation Measure	Strategic Action	Status of Action (See Municipal Plans Section for Additional Status Details)	Hazard Addressed*	Priority	Planning Level Benefit-Cost Ratio
Ellington	**Structural Projects - Improve Drainage, Culverts, Roads & Bridges**	Continue to work with CRCOG to advance Route 74 bridge renovation project on DOT list in Vernon	New Initiative	Flood	High	1.3
Ellington	**Structural Projects - Improve Drainage, Culverts, Roads & Bridges**	Continue to work with CRCOG to advance Windermere Bridge renovation project on DOT list	Completed Action from 2008 Plan	Flood		1.3
Ellington	**Structural Projects -Strengthen/ Protect Critical Facilities**	Work with the Capitol Region Emergency Planning Commission to obtain generators for all five schools and the town hall complex.	Existing Action to be Continued in 2014-2019 Plan Update	All	High	1.6
Enfield	**Education & Awareness - Informational Public Outreach**	Educate residents on emergency preparedness and services available in the event of an emergency through town website and workshops.	New Initiative	All	Medium	4.8
Enfield	**Preparedness - Enhance Emergency Response: New Facilities, Equipment, Supplies, Personnel**	Upgrade and replace public works fleet.	New Initiative	Snow	High	1.1
Enfield	**Preparedness - Enhance Emergency Response: New Facilities, Equipment, Supplies, Personnel**	Fund adequate staff and private labor for snow removal operations	New Initiative	Snow	Medium	1.1
Enfield	**Preparedness - Improve Communications Systems**	Monitor implementation of Reverse-911 system and use to its greatest potential	Existing Action to be Continued in 2014-2019 Plan Update	All	Medium	1.8
Enfield	**Prevention - Assess Risks & Vulnerabilities**	Maintain currency of the FHMP	Existing Action to be Continued in 2014-2019 Plan Update	Flood	High	1.9
Enfield	**Prevention - Assess/Protect Vulnerable Populations**	Continue to involve the Visiting Nurses Association, the Housing Authority, and social service agencies in planning and training efforts	Existing Action to be Continued in 2014-2019 Plan Update	All	High	2.3
Enfield	**Prevention - Assess/Protect Vulnerable Populations**	Continue to maintain a list of special needs population	Existing Action to be Continued in 2014-2019 Plan Update	All	High	2.3
Enfield	**Prevention - Processes to Mitigate Damages to Life & Property**	Fund and institute routine maintenance of trees in town right-of-way either through town staff or private contractor.	New Initiative	All	Medium	2.0

Municipality	Type of Mitigation Measure	Strategic Action	Status of Action (See Municipal Plans Section for Additional Status Details)	Hazard Addressed*	Priority	Planning Level Benefit-Cost Ratio
Enfield	**Prevention - Strengthen Planning & Development Regulations**	Modify the Town of Enfield zoning & planning codes and ordinances to require group homes to have an emergency generator to provide power for essential home utilities, i.e. heat, refrigerator, lighting, etc. during power outages, thus enabling the residents to "shelter in place."	New Initiative	All	Medium	1.8
Enfield	**Prevention - Strengthen Planning & Development Regulations**	Continue to review development applications broadly, with administration's input	Existing Action to be Continued in 2014-2019 Plan Update	Flood	High	1.8
Enfield	**Structural Projects - Improve Drainage, Culverts, Roads & Bridges**	Continue to pursue funding opportunities to implement remaining flood mitigation projects identified in earlier plans.	Existing Action to be Continued in 2014-2019 Plan Update	Flood	High	1.3
Enfield	**Structural Projects -Strengthen/ Protect Critical Facilities**	Obtain generators for shelters.	New Initiative	All	High	1.6
Farmington	**Education & Awareness - Informational Public Outreach**	Continue to use the town newsletter and website to release relevant information.	Existing Action to be Continued in 2014-2019 Plan Update	All	High	4.8
Farmington	**Prevention - Assess Risks & Vulnerabilities**	Consider partnering with neighboring watershed communities to conduct a hydrologic study of the Farmington River	Existing Action to be Continued in 2014-2019 Plan Update	Flood	Medium	1.9
Farmington	**Prevention - Assess Risks & Vulnerabilities**	Consider performing a town-wide hydrologic study	Existing Action to be Continued in 2014-2019 Plan Update	Flood	High	1.9
Farmington	**Prevention - Processes to Mitigate Damages to Life & Property**	Improve communications with the Army Corps of Engineers to obtain advance warning of releases from the Goodwin Dam	Existing Action to be Continued in 2014-2019 Plan Update	Flood, Dams	High	2.0
Farmington	**Structural Projects - Improve Drainage, Culverts, Roads & Bridges**	Consider the feasibility of a fourth bridge over the Farmington River	Existing Action to be Continued in 2014-2019 Plan Update	Flood	Medium	1.3

Municipality	Type of Mitigation Measure	Strategic Action	Status of Action (See Municipal Plans Section for Additional Status Details)	Hazard Addressed*	Priority	Planning Level Benefit-Cost Ratio
Farmington	**Structural Projects - Improve Drainage, Culverts, Roads & Bridges**	Conduct an engineering and feasibility study of elevating Meadow Road and installing culverts to allow flow in both directions	Existing Action to be Continued in 2014-2019 Plan Update	Flood	Medium	1.3
Farmington	**Structural Projects -Strengthen/ Protect Critical Facilities**	Equip Irving E Robbins School as an emergency shelter	New Initiative	All	High	1.6
Farmington	**Structural Projects -Strengthen/ Protect Critical Facilities**	Equip Farmington Fire Station for use as the backup dispatch center and EOC.	New Initiative	Flood, All	High	1.6
Farmington	**Structural Projects -Strengthen/ Protect Critical Facilities**	Continue to work with the Capitol Region Emergency Planning Committee on obtaining generators and other supplies.	Completed Action from 2008 Plan	All		
Farmington	**Structural Projects -Strengthen/ Protect Critical Facilities**	Design a permanent retaining wall system or structure such as steel sheet piling to prevent further erosion of the existing gravel embankment.	New Initiative	Flood	High	1.6
Glastonbury	**Education & Awareness - Informational Public Outreach**	Develop materials instructing residents on measures to take care of their own properties (bleeding water lines etc.), and services offered by the Town. Post information through multiple means.	Existing Action to be Continued in 2014-2019 Plan Update	All	Medium	4.8
Glastonbury	**Preparedness - Enhance Emergency Response: New Facilities, Equipment, Supplies, Personnel**	Increase inventory of emergency response supplies and acquire storage for same (food, water, cots, oxygen cylinders, signs, electronic devices (charging stations) etc).	New Initiative	All	High	1.1
Glastonbury	**Preparedness - Enhance Emergency Response: New Facilities, Equipment, Supplies, Personnel**	Identify and purchase generator/battery powered messaging signs to provide important safety emergency information to public during times of extended power outages.	New Initiative	All	Medium	1.1
Glastonbury	**Preparedness - Enhance Emergency Response: New Facilities, Equipment, Supplies, Personnel**	Procure additional Town equipment to expedite cleanup operations as a result of storm events which include large scale snow blowing/removal and debris collection	New Initiative	All	Medium	1.1

Municipality	Type of Mitigation Measure	Strategic Action	Status of Action (See Municipal Plans Section for Additional Status Details)	Hazard Addressed*	Priority	Planning Level Benefit-Cost Ratio
		equipment.				
Glastonbury	**Preparedness - Enhance Emergency Response: New Facilities, Equipment, Supplies, Personnel**	Consider purchasing additional watercraft for emergency rescue operations during flooding.	New Initiative	Flood	Low	1.1
Glastonbury	**Prevention - Assess/Protect Vulnerable Populations**	Develop and implement messaging system to provide early alert system to isolated and high risk population utilizing Everbridge (reverse 911), Board of Education notification system and social media.	Existing 2008 Plan Action - Modified for 2014-19 Update	All	High	1.9
Glastonbury	**Prevention - Assess/Protect Vulnerable Populations**	Continue voluntary registry and classifications of those individuals who may require special assistance in an emergency	Existing 2008 Plan Action - Modified for 2014-19 Update	All	High	2.3
Glastonbury	**Prevention - Processes to Mitigate Damages to Life & Property**	Secure contractual tree removal services and equipment prior to storm response and cleanup	New Initiative	All	High	2.0
Glastonbury	**Prevention - Processes to Mitigate Damages to Life & Property**	Increase Town budget for the trimming and removal of potentially hazardous trees	New Initiative	All	Medium	2.0
Glastonbury	**Prevention - Strengthen Planning & Development Regulations**	Continue to implement and enforce regulations	Existing Action to be Continued in 2014-2019 Plan Update	Flood	High	1.8
Glastonbury	**Structural Projects - Improve Drainage, Culverts, Roads & Bridges**	Consider drainage improvements to Shoddy Mill, Forest Lane and other areas of periodic flooding.	New Initiative	Flood	Low	1.3
Glastonbury	**Structural Projects - Improve Drainage, Culverts, Roads & Bridges**	Study the feasibility of elevating the Naubuc Avenue Bridge	Completed Action from 2008 Plan	Flood		
Glastonbury	**Structural Projects -Strengthen/ Protect Critical Facilities**	Establish state of the art EOC at Academy Building and equip Police Training Room as backup EOC. Utilize Fire Company #3 and #4 as additional back-ups as needed.	New Initiative	All	High	1.6

Municipality	Type of Mitigation Measure	Strategic Action	Status of Action (See Municipal Plans Section for Additional Status Details)	Hazard Addressed*	Priority	Planning Level Benefit-Cost Ratio
Glastonbury	**Structural Projects -Strengthen/ Protect Critical Facilities**	Installation of a new emergency generator at the Community Center.	New Initiative	All	High	1.6
Glastonbury	**Structural Projects -Strengthen/ Protect Critical Facilities**	Purchase mobile generators to be utilized as primary and backup power sources for Town operations.	New Initiative	All	High	1.6
Glastonbury	**Structural Projects -Strengthen/ Protect Critical Facilities**	Replace inoperable generator at the Town Hall/Academy Complex.	New Initiative	All	High	1.6
Glastonbury	**Structural Projects -Strengthen/ Protect Critical Facilities**	Replace inadequate generators at the Police, Highway and Parks Maintenance Facility	New Initiative	All	High	1.6
Glastonbury	**Structural Projects - Protect/ Improve Utility Infrastructure**	Review feasibility of micro-grid system(s) within the Town Center area to supplement Town Facilities as well as specific business community operations such as gas stations and grocery stores.	New Initiative	All	High	0.9
Granby	**Education & Awareness - Informational Public Outreach**	Educate private snow-removal contractors and residents on not obstructing roads and the right-of-way	Existing Action to be Continued in 2014-2019 Plan Update	Snow	Medium	4.8
Granby	**Education & Awareness - Informational Public Outreach**	Continue to issue press releases and advisories regarding hazardous conditions.	Existing Action to be Continued in 2014-2019 Plan Update	Snow, All	High	4.8
Granby	**Natural Resource Protection - Timber Management**	Develop and implement timber management program for town-owned property	Existing Action to be Continued in 2014-2019 Plan Update	Fire	Medium	1.4
Granby	**Natural Resource Protection - Timber Management**	Promote timber management planning with other major landholders including McLean Game Refuge, Granby Land Trust and the State	Existing Action to be Continued in 2014-2019 Plan Update	Fire	Medium	1.4
Granby	**Preparedness - Enhance Relationships & Coordination to Improve Emergency Response**	Regularly update the communication protocols with neighboring communities on road closures and detour routing	Existing 2008 Plan Action - Modified for 2014-19 Update	Flood	High	3.4

Municipality	Type of Mitigation Measure	Strategic Action	Status of Action (See Municipal Plans Section for Additional Status Details)	Hazard Addressed*	Priority	Planning Level Benefit-Cost Ratio
Granby	**Preparedness - Enhance Emergency Response Procedures**	Use GIS technology in coordinating and prioritizing response to events.	New Initiative	Flood, All	Medium	2.8
Granby	**Preparedness - Enhance Emergency Response Procedures**	Improve Public Works personnel contracts to ensure adequate staffing for storm situations.	Completed Action from 2008 Plan	Snow, All		
Granby	**Preparedness - Enhance Emergency Response: New Facilities, Equipment, Supplies, Personnel**	Pursue increased funding for equipment and labor as necessary for improved snow removal operations	Existing Action to be Continued in 2014-2019 Plan Update	Snow	Medium	1.1
Granby	**Preparedness - Enhance Emergency Response: Training**	Educate police personnel on detour routing protocols to ensure alternative routes can accommodate trucks	Existing Action to be Continued in 2014-2019 Plan Update	Flood		4.0
Granby	**Prevention - Assess Risks & Vulnerabilities**	Create a long range plan for placing utility facilities underground.	Existing Action to be Continued in 2014-2019 Plan Update	Wind	Low	1.9
Granby	**Prevention - Processes to Mitigate Damages to Life & Property**	Investigate participation in the National Flood Insurance Program's Community Rating System.	New Initiative	Flood	Medium	2.0
Granby	**Prevention - Processes to Mitigate Damages to Life & Property**	Continue to pursue opportunities for service and equipment sharing with neighboring communities through CRCOG's service sharing initiative and otherwise	Existing Action to be Continued in 2014-2019 Plan Update	Snow, All	Medium	2.0
Granby	**Prevention - Processes to Mitigate Damages to Life & Property**	Work with DEEP to continue to monitor dams as necessary	Existing Action to be Continued in 2014-2019 Plan Update	Dams, Flood	Medium	2.0
Granby	**Prevention - Processes to Mitigate Damages to Life & Property**	Seek to increase local budget for tree trimming.	Existing Action to be Continued in 2014-2019 Plan Update	Wind	Medium	2.0
Granby	**Prevention - Strengthen Planning & Development Regulations**	Enforce existing ordinance prohibiting roadway obstructions.	Existing Action to be Continued in 2014-2019 Plan Update	Snow	Medium	1.8
Granby	**Prevention - Strengthen Planning & Development Regulations**	Continue to work with FEMA and DEEP to maintain zoning, subdivision and wetlands regulations current with best practices	Existing Action to be Continued in 2014-2019 Plan Update	Flood	High	1.8
Granby	**Prevention - Strengthen Planning & Development Regulations**	Promote and implement best practices, such as fire roads, dry hydrants, etc.	Existing Action to be Continued in 2014-2019 Plan Update	Fire	Medium	1.8

Municipality	Type of Mitigation Measure	Strategic Action	Status of Action (See Municipal Plans Section for Additional Status Details)	Hazard Addressed*	Priority	Planning Level Benefit-Cost Ratio
Granby	**Prevention - Strengthen Planning & Development Regulations**	Consider regulations requiring dry hydrant installations in new developments	Existing Action to be Continued in 2014-2019 Plan Update	Fire	Medium	1.8
Granby	**Prevention - Strengthen Planning & Development Regulations**	Update the stormwater management plan as necessary	Existing 2008 Plan Action - Modified for 2014-19 Update	Flood	Medium	1.8
Granby	**Structural Projects - Improve Drainage, Culverts, Roads & Bridges**	Address priority bridges, culverts and other drainage projects as may be identified in Capital Improvement Plan	Existing Action to be Continued in 2014-2019 Plan Update	Flood	High	1.3
Granby	**Structural Projects - Protect/ Improve Utility Infrastructure**	Pursue opportunities to relocate wires where they are vulnerable: areas of repetitive power failure	Existing Action to be Continued in 2014-2019 Plan Update	Wind	Medium	0.9
Hartford	**Education & Awareness - Workshops and Forums**	Continue to offer educational forums for residents on personal emergency planning	Existing Action to be Continued in 2014-2019 Plan Update	All	Medium	3.8
Hartford	**Preparedness - Enhance Emergency Response: Training**	Continue with National Incident Management System (NIMS) and Incident Management Team training, with a particular focus on response to natural disasters	Existing Action to be Continued in 2014-2019 Plan Update	All	High	4.0
Hartford	**Preparedness - Enhance Emergency Response: Training**	Participate in local and regional hurricane evacuation training	Existing Action to be Continued in 2014-2019 Plan Update; Training Completed in 2013	Wind	High	4.0
Hartford	**Preparedness - Improve Communications Systems**	Investigate communications systems that will allow for emergency personnel to communicate in currently uncovered areas, and will facilitate interdepartmental communications along the flood control system	Completed Action from 2008 Plan	All, Flood		
Hartford	**Preparedness - Improve Communications Systems**	Take full advantage of Reverse-911 system.	Discontinued Action from 2008 Plan	All	Medium	
Hartford	**Prevention - Assess/Protect Vulnerable Populations**	Research, identify means, including potential acquisition of public address systems, for facilitating communications with residents, especially those in low-income areas vulnerable to disasters	Existing Action to be Continued in 2014-2019 Plan Update	All	Medium	2.3

Municipality	Type of Mitigation Measure	Strategic Action	Status of Action (See Municipal Plans Section for Additional Status Details)	Hazard Addressed*	Priority	Planning Level Benefit-Cost Ratio
Hartford	**Prevention - Assess/Protect Vulnerable Populations**	Continue training for evacuation of special needs populations	Existing Action to be Continued in 2014-2019 Plan Update	All	Medium	2.3
Hartford	**Prevention - Assess/Protect Vulnerable Populations**	Support regional assessments of how to identify, maintain and use databases of special needs populations	Existing Action to be Continued in 2014-2019 Plan Update	All	Medium	2.3
Hartford	**Prevention - Processes to Mitigate Damages to Life & Property**	Maintain refrigeration for perishable food items.	New Initiative	All	High	2.0
Hartford	**Prevention - Processes to Mitigate Damages to Life & Property**	Continue to participate in the MDC's Clean Water Project planning process	Existing Action to be Continued in 2014-2019 Plan Update	Flood	High	2.0
Hartford	**Prevention - Processes to Mitigate Damages to Life & Property**	Update the flood control system maintenance manual	Existing Action to be Continued in 2014-2019 Plan Update	Flood	Medium	2.0
Hartford	**Prevention - Processes to Mitigate Damages to Life & Property**	Train City employees, according to updated manual, in proper maintenance techniques	Existing Action to be Continued in 2014-2019 Plan Update	Flood	Medium	2.0
Hartford	**Prevention - Processes to Mitigate Damages to Life & Property**	Pursue priority debris related projects, especially along the North Branch of the Park River, identified in the Capital Improvement Plan	Existing Action to be Continued in 2014-2019 Plan Update	Flood	Medium	2.0
Hartford	**Prevention - Processes to Mitigate Damages to Life & Property**	Inspect and clean Park River relief conduit	Existing Action to be Continued in 2014-2019 Plan Update	Flood	Medium	2.0
Hartford	**Prevention - Processes to Mitigate Damages to Life & Property**	Consider applying to FEMA's Community Rating System (CRS) program to help reduce flood insurance premiums for property owners	Existing Action to be Continued in 2014-2019 Plan Update	Flood	Medium	2.0
Hartford	**Structural Projects - Improve Drainage, Culverts, Roads & Bridges**	Pursue priority drainage projects identified in Capital Improvement Plan	Existing Action to be Continued in 2014-2019 Plan Update	Flood	High	1.3
Hartford	**Structural Projects -Strengthen/ Protect Critical Facilities**	Ensure that the City's flood control pump stations can handle changes that may result from MDC measures to address combined sewer overflows	Existing Action to be Continued in 2014-2019 Plan Update	Flood	High	1.6

Municipality	Type of Mitigation Measure	Strategic Action	Status of Action (See Municipal Plans Section for Additional Status Details)	Hazard Addressed*	Priority	Planning Level Benefit-Cost Ratio
Hartford	**Structural Projects -Strengthen/ Protect Critical Facilities**	Continue to implement necessary repairs and upgrades required by FEMA and the Army Corps of Engineers to retain certification	Existing Action to be Continued in 2014-2019 Plan Update	Flood	High	1.6
Hartford	**Structural Projects -Strengthen/ Protect Critical Facilities**	Upgrade flood control facilities to automate warning systems and as many other features as possible to increase safety	Existing Action to be Continued in 2014-2019 Plan Update	Flood	High	1.6
Hebron	**Education & Awareness - Informational Public Outreach**	Develop and disseminate public outreach materials to citizens	Existing Action to be Continued in 2014-2019 Plan Update	All	High	4.8
Hebron	**Natural Resource Protection - Timber Management**	Develop and implement timber management plan for town-owned forested land	Existing Action to be Continued in 2014-2019 Plan Update	Fire	Medium	1.4
Hebron	**Preparedness - Enhance Relationships & Coordination to Improve Emergency Response**	Continue informal arrangements with private contractors	Existing Action to be Continued in 2014-2019 Plan Update	Snow, All	Medium	3.4
Hebron	**Preparedness - Enhance Emergency Response: New Facilities, Equipment, Supplies, Personnel**	Establish the Fairgrounds as a shelter for pets and other animals and as a staging location for shuttle service to and from the shelter.	New Initiative	All	High	1.1
Hebron	**Preparedness - Enhance Emergency Response: New Facilities, Equipment, Supplies, Personnel**	Expand salt/sand storage facilities	Existing Action to be Continued in 2014-2019 Plan Update	Snow	High	1.1
Hebron	**Prevention - Assess Risks & Vulnerabilities**	Continue to monitor bridges and culverts for adequate flow capacity	Existing Action to be Continued in 2014-2019 Plan Update	Flood	High	1.9
Hebron	**Prevention - Assess/Protect Vulnerable Populations**	Establish a security review of all schools, reevaluate current school plans, and establish Standard Operations Plan (SOP) for all schools in the Town of Hebron	New Initiative	All	High	2.3
Hebron	**Prevention - Assess/Protect Vulnerable Populations**	Continue to maintain special needs population list for monitoring during emergency situations	Existing Action to be Continued in 2014-2019 Plan Update	All	High	2.3

Municipality	Type of Mitigation Measure	Strategic Action	Status of Action (See Municipal Plans Section for Additional Status Details)	Hazard Addressed*	Priority	Planning Level Benefit-Cost Ratio
Hebron	**Prevention - Processes to Mitigate Damages to Life & Property**	Maintain and implement equipment replacement schedules	Existing Action to be Continued in 2014-2019 Plan Update	Snow, All	Medium	2.0
Hebron	**Prevention - Processes to Mitigate Damages to Life & Property**	Investigate regional service sharing initiatives	Existing Action to be Continued in 2014-2019 Plan Update	Snow, All	Medium	2.0
Hebron	**Prevention - Processes to Mitigate Damages to Life & Property**	Continue with tree maintenance program	Existing Action to be Continued in 2014-2019 Plan Update	Snow, Wind, All	High	2.0
Hebron	**Prevention - Strengthen Planning & Development Regulations**	Continue to encourage installation of dry hydrants in new developments without water sources	Existing Action to be Continued in 2014-2019 Plan Update	Fire	High	1.8
Hebron	**Prevention - Strengthen Planning & Development Regulations**	Continue to enforce development regulations to minimize impacts on wetlands and flood zones	Existing Action to be Continued in 2014-2019 Plan Update	Flood	High	1.8
Hebron	**Structural Projects -Strengthen/ Protect Critical Facilities**	Establish RHAM High School as a regional shelter	New Initiative	All	High	1.6
Hebron	**Structural Projects -Strengthen/ Protect Critical Facilities**	Establish Town Hall as the Emergency Operations Center with generator	New Initiative	All	High	1.6
Manchester	**Education & Awareness - Informational Public Outreach**	Implement an educational system for property owners, including appropriate materials and means for information dissemination. (Include information on importance of properly maintaining private trees)	Existing Action to be Continued in 2014-2019 Plan Update	Flood	Medium	4.8
Manchester	**Education & Awareness - Informational Public Outreach**	Implement an educational program for private owners including materials and recommendations for appropriate remediation of private utilities that have been subjected to flooding, for health protection and promotion	Existing Action to be Continued in 2014-2019 Plan Update	Flood, All	Medium	4.8
Manchester	**Education & Awareness - Targeted Outreach**	Continue to update identified private properties including businesses, food service establishments, daycares and group homes served by private wells and/or on-site septic systems located within known flood risks	Existing Action to be Continued in 2014-2019 Plan Update	Flood	High	3.6

Municipality	Type of Mitigation Measure	Strategic Action	Status of Action (See Municipal Plans Section for Additional Status Details)	Hazard Addressed*	Priority	Planning Level Benefit-Cost Ratio
Manchester	**Preparedness - Enhance Relationships & Coordination to Improve Emergency Response**	Continue communications with Vernon emergency management personnel	Existing Action to be Continued in 2014-2019 Plan Update	Flood, Dams	High	3.4
Manchester	**Preparedness - Enhance Emergency Response Procedures**	Maintain list of on-call consultant engineers who can provide necessary assistance for structural and other specialized engineering assistance in response to impacts from natural disasters	Existing Action to be Continued in 2014-2019 Plan Update	All	Medium	2.8
Manchester	**Prevention - Assess Risks & Vulnerabilities**	Determine real estate disclosure practices in high risk areas	Existing Action to be Continued in 2014-2019 Plan Update	Flood	High	1.9
Manchester	**Structural Projects - Improve Drainage, Culverts, Roads & Bridges**	Upgrade identified flood prone roadways to reduce potential for access being blocked due to flooding	Existing Action to be Continued in 2014-2019 Plan Update	Flood	High	1.3
Manchester	**Structural Projects - Improve Drainage, Culverts, Roads & Bridges**	Upgrade bridge and/or other structure replacements based upon potential impact from flood hazards	Existing Action to be Continued in 2014-2019 Plan Update	Flood	Medium	1.3
Manchester	**Structural Projects -Strengthen/ Protect Critical Facilities**	Implement needed improvements to build a new Emergency Operations Center, when funding is available, at the Department of Public Works facility to withstand hurricanes and other disasters.	Completed Action from 2008 Plan	All		
Manchester	**Structural Projects -Strengthen/ Protect Critical Facilities**	Implement needed upgrades to electrical system at the Senior Center, which is the primary emergency shelter to allow year-round use.	Completed Action from 2008 Plan	All		
Manchester	**Structural Projects -Strengthen/ Protect Critical Facilities**	Install operating generators at all primary and tertiary shelters and designated alternate care sites.	Completed Action from 2008 Plan	All		
Manchester	**Structural Projects -Strengthen/ Protect Critical Facilities**	Upgrade Emergency Operations Center communications system, including any necessary building upgrades.	Completed Action from 2008 Plan	All		

Municipality	Type of Mitigation Measure	Strategic Action	Status of Action (See Municipal Plans Section for Additional Status Details)	Hazard Addressed*	Priority	Planning Level Benefit-Cost Ratio
Marlborough	**Education & Awareness - Informational Public Outreach**	Educate residents on emergency preparedness and services available in the event of an emergency through town website, print media and other means	Existing Action to be Continued in 2014-2019 Plan Update	All	Medium	4.8
Marlborough	**Preparedness - Enhance Emergency Response Procedures**	Expand citizen volunteers available to manage the town shelter	New Initiative	All	Low	2.8
Marlborough	**Preparedness - Enhance Emergency Response: New Facilities, Equipment, Supplies, Personnel**	Fund and perform routine maintenance on and replacement of public works fleet	Existing Action to be Continued in 2014-2019 Plan Update	All	High	1.1
Marlborough	**Preparedness - Enhance Emergency Response: New Facilities, Equipment, Supplies, Personnel**	Fund adequate staff and private labor for snow removal operations	Existing Action to be Continued in 2014-2019 Plan Update	Snow	Medium	1.1
Marlborough	**Preparedness - Enhance Emergency Response: Training**	Establish a local CERT team.	New Initiative	All	Medium	4.0
Marlborough	**Preparedness - Improve Communications Systems**	Expand citizen registration in Marlborough Alerts/Everbridge Program	New Initiative	All	High	1.8
Marlborough	**Prevention - Assess Risks & Vulnerabilities**	Prepare a forest fire suppression study.	New Initiative	Fire	Low	1.9
Marlborough	**Prevention - Assess Risks & Vulnerabilities**	Monitor utility right-of-way maintenance	Existing Action to be Continued in 2014-2019 Plan Update	All, Snow, Wind	Medium	1.9
Marlborough	**Prevention - Processes to Mitigate Damages to Life & Property**	Fund and institute routine maintenance of trees in town right-of-way either through town staff or private contractor	Existing Action to be Continued in 2014-2019 Plan Update	All, Snow, Wind	Medium	2.0
Marlborough	**Prevention - Processes to Mitigate Damages to Life & Property**	Investigate opportunities for cost savings through sharing tree maintenance services with neighboring communities through CRCOG service sharing initiatives or otherwise	Existing Action to be Continued in 2014-2019 Plan Update	All, Snow, Wind	Medium	2.0
Marlborough	**Structural Projects -Strengthen/ Protect Critical Facilities**	Pursue opportunities, through CREPC and otherwise, to obtain generators for shelters	Existing Action to be Continued in 2014-2019 Plan Update	All	High	1.6

Municipality	Type of Mitigation Measure	Strategic Action	Status of Action (See Municipal Plans Section for Additional Status Details)	Hazard Addressed*	Priority	Planning Level Benefit-Cost Ratio
Newington	**Education & Awareness - Targeted Outreach**	Notify Wilbur Smith, who is conducting the New Haven-Springfield commuter rail study, of town's flooding and rail safety concerns, and of NRCS study's recommendations	Completed Action from 2008 Plan	Flood, Other		
Newington	**Education & Awareness - Targeted Outreach**	Continue to support Metropolitan District Commission efforts to disconnect residential tie-ins to the sewer system	Existing Action to be Continued in 2014-2019 Plan Update	Flood	Medium	3.6
Newington	**Preparedness - Enhance Relationships & Coordination to Improve Emergency Response**	Continue to support CT DOT in state road treatment	Existing Action to be Continued in 2014-2019 Plan Update	Snow	Medium	3.4
Newington	**Preparedness - Enhance Relationships & Coordination to Improve Emergency Response**	Ensure proper operations of Emergency Operations Center (EOC)	New Initiative	All	High	3.4
Newington	**Preparedness - Enhance Emergency Response: New Facilities, Equipment, Supplies, Personnel**	Plan and implement enhanced salt road treatment technology, including storage facility construction	Existing Action to be Continued in 2014-2019 Plan Update	Snow	Medium	1.1
Newington	**Preparedness - Enhance Emergency Response: Training**	Continue training through Local Emergency Planning Committee	Existing Action to be Continued in 2014-2019 Plan Update	All	High	4.0
Newington	**Prevention - Processes to Mitigate Damages to Life & Property**	Ensure that Amtrak properly maintains existing drainage system around rail bed	Existing Action to be Continued in 2014-2019 Plan Update	Flood	Medium	2.0
Newington	**Prevention - Processes to Mitigate Damages to Life & Property**	Ensure Town properly maintains its drainage facilities near Stamm Road/Piper Brook complex	Existing Action to be Continued in 2014-2019 Plan Update	Flood	Medium	2.0
Newington	**Prevention - Processes to Mitigate Damages to Life & Property**	Develop and implement street and public tree maintenance plan	Existing Action to be Continued in 2014-2019 Plan Update	Wind	Medium	2.0
Newington	**Structural Projects - Improve Drainage, Culverts, Roads & Bridges**	Coordinate with Central CT State University, Amtrak, CT Department of Transportation and Northeast Utilities to implement recommendations of the NRCS study of Piper Brook/Stamm Road area and\or explore other alternatives (design initiatives) to ameliorate the flooding.	Existing Action to be Continued in 2014-2019 Plan Update	Flood	High	1.3

Municipality	Type of Mitigation Measure	Strategic Action	Status of Action (See Municipal Plans Section for Additional Status Details)	Hazard Addressed*	Priority	Planning Level Benefit-Cost Ratio
Newington	**Structural Projects - Improve Drainage, Culverts, Roads & Bridges**	Reduce the likelihood of flooding by improving natural and artificial drainage systems	New Initiative	Flood	High	1.3
Rocky Hill	**Preparedness - Enhance Relationships & Coordination to Improve Emergency Response**	Work with the State DOT towards better coordination and quicker State response to clear State Roads	New Initiative	All	High	3.4
Rocky Hill	**Preparedness - Enhance Emergency Response Procedures**	Continue to work with and improve coordination with utility companies to provide first order power restoration to Century Hills, senior housing, age restricted developments and assisted living developments.	New Initiative	All	High	3.4
Rocky Hill	**Preparedness - Enhance Emergency Response Procedures**	Ensure and supply transportation access to emergency shelters	Existing Action to be Continued in 2014-2019 Plan Update	All	High	3.4
Rocky Hill	**Preparedness - Enhance Emergency Response: New Facilities, Equipment, Supplies, Personnel**	Seek funding sources for purchase of shelter supplies	New Initiative	All	Medium	1.1
Rocky Hill	**Preparedness - Enhance Emergency Response: New Facilities, Equipment, Supplies, Personnel**	Acquired specialize snow removal equipment	New Initiative	Snow	High	1.1
Rocky Hill	**Preparedness - Enhance Emergency Response: New Facilities, Equipment, Supplies, Personnel**	Prepare plans to identify a potential site for a warehouse facility for storage of emergency sheltering resources as State/Federal funding becomes available.	Existing Action to be Continued in 2014-2019 Plan Update	All	High	1.1
Rocky Hill	**Preparedness - Enhance Emergency Response: New Facilities, Equipment, Supplies, Personnel**	Continue to replenish sheltering supplies (cots, water, food, etc.) as expiration dates warrant.	Existing 2008 Plan Action - Modified for 2014-19 Update	All	Medium	1.1
Rocky Hill	**Preparedness - Improve Communications Systems**	Continue with advanced notification and education of flood impacted property owners.	New Initiative	Flood	High	1.8
Rocky Hill	**Prevention - Processes to Mitigate Damages to Life & Property**	Continue to support MDC's Clean Water project	New Initiative	Flood	Medium	2.0

Municipality	Type of Mitigation Measure	Strategic Action	Status of Action (See Municipal Plans Section for Additional Status Details)	Hazard Addressed*	Priority	Planning Level Benefit-Cost Ratio
Rocky Hill	**Prevention - Processes to Mitigate Damages to Life & Property**	Hold meetings on a regular basis with utilities to plan and coordinate natural hazard mitigation and coordinated disaster response.	Existing Action to be Continued in 2014-2019 Plan Update	All	High	2.0
Rocky Hill	**Prevention - Processes to Mitigate Damages to Life & Property**	Hold meetings with utilities and nearby towns on a regular basis to plan and coordinate natural hazard mitigation and coordinated disaster response.	Existing 2008 Plan Action - Modified for 2014-19 Update	All	Medium	2.0
Rocky Hill	**Prevention - Strengthen Planning & Development Regulations**	Continue enforcement of fire hydrant and sidewalk clearing ordinance	New Initiative	Snow	High	1.8
Rocky Hill	**Prevention - Strengthen Planning & Development Regulations**	Continue implementation and enforcement of the Town's Flood Damage Prevention Ordinance and the Flood Overlay District Zoning Regulation.	New Initiative	Flood	High	1.8
Rocky Hill	**Prevention - Strengthen Planning & Development Regulations**	Continue municipal education and fine program to disconnect residential sump pumps from sewage system.	Existing 2008 Plan Action - Modified for 2014-19 Update	Flood	Medium	1.8
Rocky Hill	**Structural Projects - Acquisition/ Relocation**	Acquire targeted properties as State/Federal funding becomes available	New Initiative	Flood	Low	0.9
Rocky Hill	**Structural Projects - Improve Drainage, Culverts, Roads & Bridges**	Improve the drainage on Beach Road by installing a box culvert raising the road above the flood elevation.	New Initiative	Flood	Medium	1.3
Rocky Hill	**Structural Projects - Improve Drainage, Culverts, Roads & Bridges**	Improve the end of France Street to provide a two lane road meeting current design standards.	New Initiative	Flood, All	Medium	1.3
Rocky Hill	**Structural Projects - Improve Drainage, Culverts, Roads & Bridges**	Complete Belden Brook piping.	Completed Action from 2008 Plan	Flood		
Rocky Hill	**Structural Projects - Improve Drainage, Culverts, Roads & Bridges**	Improve drainage system in the Terry Lane/Elm Ridge Park area.	Completed Action from 2008 Plan	Flood		

Municipality	Type of Mitigation Measure	Strategic Action	Status of Action (See Municipal Plans Section for Additional Status Details)	Hazard Addressed*	Priority	Planning Level Benefit-Cost Ratio
Rocky Hill	**Structural Projects -Strengthen/ Protect Critical Facilities**	Work with the MDC towards implementation of flood protection measures.	New Initiative	Flood	Medium	1.6
Rocky Hill	**Structural Projects -Strengthen/ Protect Critical Facilities**	Supply new generators and appropriate fuel for The EOC/Police Station, the Library, the High School and West Hill School to be used as emergency shelters	Existing 2008 Plan Action - Modified for 2014-19 Update	All	High	1.6
Simsbury	**Preparedness - Enhance Relationships & Coordination to Improve Emergency Response**	Co-ordinate efforts with DOT for Rt 185 work	New Initiative	Flood	High	3.4
Simsbury	**Preparedness - Enhance Relationships & Coordination to Improve Emergency Response**	Maintain relationship with CL&P - currently CL&P serves on local public safety committee	Existing Action to be Continued in 2014-2019 Plan Update	Snow, Wind	High	3.4
Simsbury	**Preparedness - Enhance Relationships & Coordination to Improve Emergency Response**	Maintain informal agreements with local contractors for emergency debris removal work	Existing Action to be Continued in 2014-2019 Plan Update	Snow, Wind	High	3.4
Simsbury	**Preparedness - Enhance Relationships & Coordination to Improve Emergency Response**	Maintain mutual aid agreements with neighboring communities	Existing Action to be Continued in 2014-2019 Plan Update	All	Medium	3.4
Simsbury	**Preparedness - Enhance Emergency Response: New Facilities, Equipment, Supplies, Personnel**	Purchase mechanical signs.	Completed Action from 2008 Plan	All		
Simsbury	**Preparedness - Improve Communications Systems**	Continue to implement upgrades to fire, police and town-wide communications systems	Existing Action to be Continued in 2014-2019 Plan Update	All	Medium	1.8
Simsbury	**Prevention - Assess/Protect Vulnerable Populations**	Maintain special needs population list	Existing Action to be Continued in 2014-2019 Plan Update	All	Medium	2.3
Simsbury	**Prevention - Assess/Protect Vulnerable Populations**	Work with convalescent and day care centers to plan for evacuations	Existing Action to be Continued in 2014-2019 Plan Update	All	Medium	2.3
Simsbury	**Prevention - Processes to Mitigate Damages to Life & Property**	Explore participation in the Community Rating System	Existing Action to be Continued in 2014-2019 Plan Update	Flood	High	2.0

Municipality	Type of Mitigation Measure	Strategic Action	Status of Action (See Municipal Plans Section for Additional Status Details)	Hazard Addressed*	Priority	Planning Level Benefit-Cost Ratio
Simsbury	**Prevention - Processes to Mitigate Damages to Life & Property**	Continue local tree maintenance work	Existing Action to be Continued in 2014-2019 Plan Update	Snow, Wind	Medium	2.0
Simsbury	**Prevention - Strengthen Planning & Development Regulations**	Continue to implement regulations prohibiting net flow increase from new development	Existing Action to be Continued in 2014-2019 Plan Update	Flood, Drought	High	1.8
Simsbury	**Prevention - Strengthen Planning & Development Regulations**	Implement recommended regulations that result from study of impervious coverage in various areas of town	Existing Action to be Continued in 2014-2019 Plan Update	Flood, Drought	Medium	1.8
Simsbury	**Structural Projects - Acquisition/ Relocation**	Pursue acquisition of parcels with potential for development along or within 100-year floodplain to preserve as open space.	Completed Action from 2008 Plan	Flood		
Simsbury	**Structural Projects - Improve Drainage, Culverts, Roads & Bridges**	Raise Riverside Road near Drake Hill Bridge	New Initiative	Flood	High	1.3
Simsbury	**Structural Projects - Improve Drainage, Culverts, Roads & Bridges**	Raise Rt 185 near East Weatogue Street	New Initiative	Flood	High	1.3
Simsbury	**Structural Projects - Improve Drainage, Culverts, Roads & Bridges**	Upgrade culverts associated with Stratton Brook on Town Forest and Stratton Brook Roads	Existing Action to be Continued in 2014-2019 Plan Update	Flood	Medium	1.3
Simsbury	**Structural Projects - Improve Drainage, Culverts, Roads & Bridges**	Upgrade culverts associated with Bissell Brook on Fire Town Road.	Completed Action from 2008 Plan	Flood		
Simsbury	**Structural Projects -Strengthen/ Protect Critical Facilities**	Equip secondary shelter at Tariffville School	New Initiative	All	Medium	1.6
Simsbury	**Structural Projects -Strengthen/ Protect Critical Facilities**	Work with CREPC to obtain funding to purchase generators for shelters	Existing Action to be Continued in 2014-2019 Plan Update	All	Medium	1.6
Somers	**Education & Awareness - Informational Public Outreach**	Educate residents on having a personal family disaster safety plan and emergency supply kit.	Existing 2008 Plan Action - Modified for 2014-19 Update	All	High	4.8
Somers	**Education & Awareness - Targeted Outreach**	Encourage new developments housing special needs populations to include generators for sheltering on site	Existing Action to be Continued in 2014-2019 Plan Update	All	Medium	3.6

Municipality	Type of Mitigation Measure	Strategic Action	Status of Action (See Municipal Plans Section for Additional Status Details)	Hazard Addressed*	Priority	Planning Level Benefit-Cost Ratio
Somers	**Prevention - Processes to Mitigate Damages to Life & Property**	Implement the recommendations of the Somers Floodplain Management Study	Existing Action to be Continued in 2014-2019 Plan Update	Flood	High	2.0
Somers	**Prevention - Processes to Mitigate Damages to Life & Property**	Continue to use the Floodplain Management Study as a resource in determining the potential impacts of proposed development and town projects to be included in the Capital Improvements Program.	Existing Action to be Continued in 2014-2019 Plan Update	Flood	Medium	2.0
Somers	**Prevention - Processes to Mitigate Damages to Life & Property**	Work with the DEEP to improve the Camp Road dam.	Existing Action to be Continued in 2014-2019 Plan Update	Dam	Medium	2.0
Somers	**Prevention - Processes to Mitigate Damages to Life & Property**	Investigate participation in FEMA's Community Rating System program.	Existing Action to be Continued in 2014-2019 Plan Update	Flood	Medium	2.0
Somers	**Prevention - Processes to Mitigate Damages to Life & Property**	Continue preventive tree maintenance	Existing Action to be Continued in 2014-2019 Plan Update	Wind, Snow, All	High	2.0
Somers	**Prevention - Strengthen Planning & Development Regulations**	Continue installation of dry hydrants and cisterns in needed areas of Town.	Existing 2008 Plan Action - Modified for 2014-19 Update	Fire	Medium	1.8
Somers	**Structural Projects - Improve Drainage, Culverts, Roads & Bridges**	Improve drainage system through continued replacement and maintenance of older culverts.	Existing 2008 Plan Action - Modified for 2014-19 Update	Flood	Medium	1.3
Somers	**Structural Projects -Strengthen/ Protect Critical Facilities**	Acquire emergency generators at Town Hall and Senior Center to ensure continuity of government and provide additional sheltering capacity	Existing 2008 Plan Action - Modified for 2014-19 Update	All	High	1.6
South Windsor	**Education & Awareness - Informational Public Outreach**	Use municipal website, Facebook, Twitter, Everbridge, You-Tube, and all other available means of social media to educate residents on emergency preparedness	Existing 2008 Plan Action - Modified for 2014-19 Update	All	Medium	4.8
South Windsor	**Preparedness - Enhance Relationships & Coordination to Improve Emergency Response**	Improve coordination with State DOT for emergency staging and management for debris, snow, and all other emergencies	New Initiative	All	High	3.4

Municipality	Type of Mitigation Measure	Strategic Action	Status of Action (See Municipal Plans Section for Additional Status Details)	Hazard Addressed*	Priority	Planning Level Benefit-Cost Ratio
South Windsor	**Preparedness - Enhance Relationships & Coordination to Improve Emergency Response**	Continue regional efforts to improve communications with CL&P and address lockout/tag out system issues	Existing 2008 Plan Action - Modified for 2014-19 Update	All	High	3.4
South Windsor	**Preparedness - Enhance Emergency Response Procedures**	Work with CRCOG and State DEEP to establish a regional debris management site	New Initiative	All	High	2.8
South Windsor	**Preparedness - Enhance Emergency Response Procedures**	Establish MOU with local food distributors and special emergency response equipment suppliers for emergency services	New Initiative	All	High	2.8
South Windsor	**Preparedness - Enhance Emergency Response: New Facilities, Equipment, Supplies, Personnel**	Establish a local debris processing site at Barton Property	New Initiative	All	High	1.1
South Windsor	**Preparedness - Enhance Emergency Response: New Facilities, Equipment, Supplies, Personnel**	Support replacement of equipment	New Initiative	All	High	1.1
South Windsor	**Preparedness - Enhance Emergency Response: New Facilities, Equipment, Supplies, Personnel**	Purchase cots, food supplies, and other equipment for emergency operations	New Initiative	All	High	1.1
South Windsor	**Preparedness - Enhance Emergency Response: Training**	Continue effort to require new employees to sign on to Everbridge System	New Initiative	All	Medium	4.0
South Windsor	**Preparedness - Improve Communications Systems**	Purchase and implement call-back number communication system which will enable the town to broadcast.	Completed Action from 2008 Plan	All		
South Windsor	**Prevention - Assess Risks & Vulnerabilities**	Produce GIS mapping of critical town facilities	New Initiative	All	High	1.9
South Windsor	**Prevention - Assess Risks & Vulnerabilities**	Assess and make recommendations on public and private structures including, but not limited to, Avery Heights dam, dam at Lake St., dam at Veteran's Park off Parkview Dr., and Dzen's dam	Existing Action to be Continued in 2014-2019 Plan Update	Dams	Medium	1.9
South Windsor	**Prevention - Assess/Protect Vulnerable Populations**	Continue to maintain special needs population list	Existing Action to be Continued in 2014-2019 Plan Update	All	Medium	2.3

Municipality	Type of Mitigation Measure	Strategic Action	Status of Action (See Municipal Plans Section for Additional Status Details)	Hazard Addressed*	Priority	Planning Level Benefit-Cost Ratio
South Windsor	**Prevention - Processes to Mitigate Damages to Life & Property**	Schedule quarterly reviews of GIS layers (data sets) and Town EOP	New Initiative	All	High	2.0
South Windsor	**Prevention - Processes to Mitigate Damages to Life & Property**	Prioritize recommended measures and work with property owners to implement dam repairs and improvements	Existing Action to be Continued in 2014-2019 Plan Update	Dams	Medium	2.0
South Windsor	**Prevention - Processes to Mitigate Damages to Life & Property**	Investigate participating in FEMA's Community Rating System.	Existing Action to be Continued in 2014-2019 Plan Update	Flood	Medium	2.0
South Windsor	**Prevention - Processes to Mitigate Damages to Life & Property**	Continue to contract out tree maintenance work, and to work with CL&P to maintain right-of-ways	Existing 2008 Plan Action - Modified for 2014-19 Update	Wind, Snow	Medium	2.0
South Windsor	**Prevention - Strengthen Planning & Development Regulations**	Continue to enforce regulations requiring the dedication of open space in new developments	Existing Action to be Continued in 2014-2019 Plan Update	All	Medium	1.8
South Windsor	**Prevention - Strengthen Planning & Development Regulations**	Continue to enforce wetlands regulations	Existing Action to be Continued in 2014-2019 Plan Update	All	Medium	1.8
South Windsor	**Prevention - Strengthen Planning & Development Regulations**	Ensure that privately owned and installed generators are installed correctly	Existing Action to be Continued in 2014-2019 Plan Update	All	Medium	1.8
South Windsor	**Prevention - Strengthen Planning & Development Regulations**	Will consider whether in the future there is a need to adopt a regulation that requires senior housing developments to install some kind of generator to power at least a communal space	Existing 2008 Plan Action - Modified for 2014-19 Update	All	Medium	1.8
South Windsor	**Structural Projects - Protect/ Improve Utility Infrastructure**	Harden equipment for potential solar activity	New Initiative	Other	Medium	0.9
South Windsor	**Structural Projects -Strengthen/ Protect Critical Facilities**	Provide generators for Town shelters, Town Garage, Town Hall, and Police Department	New Initiative	All	High	1.6
Stafford	**Education & Awareness - Informational Public Outreach**	Educate private snow-removal contractors and residents on not obstructing roads and the right-of-way	New Initiative	Snow	Medium	4.8

Municipality	Type of Mitigation Measure	Strategic Action	Status of Action (See Municipal Plans Section for Additional Status Details)	Hazard Addressed*	Priority	Planning Level Benefit-Cost Ratio
Stafford	**Education & Awareness - Informational Public Outreach**	Continue to issue press releases and advisories	New Initiative	Snow, All	High	4.8
Stafford	**Preparedness - Enhance Relationships & Coordination to Improve Emergency Response**	Improve communications with neighboring communities on road closures and detour routing	New Initiative	Flood, All	High	3.4
Stafford	**Preparedness - Enhance Emergency Response Procedures**	Improve Public Works personnel contracts to ensure adequate staffing for storm situations	New Initiative	Snow, All	Low	2.8
Stafford	**Preparedness - Enhance Emergency Response: New Facilities, Equipment, Supplies, Personnel**	Pursue increased funding for equipment and labor	New Initiative	Snow	Medium	1.1
Stafford	**Preparedness - Enhance Emergency Response: Training**	Educate police personnel on detour routing protocols to ensure alternative routes can accommodate trucks	New Initiative	Flood, All	Medium	4.0
Stafford	**Prevention - Assess Risks & Vulnerabilities**	Create a long range plan for undergrounding existing facilities	New Initiative	Wind	Low	1.9
Stafford	**Prevention - Processes to Mitigate Damages to Life & Property**	Continue to pursue opportunities for service and equipment sharing with neighboring communities through CRCOG's service sharing initiative and otherwise	New Initiative	Snow, All	Low	2.0
Stafford	**Prevention - Processes to Mitigate Damages to Life & Property**	Work with DEEP to continue to monitor critical dams.	New Initiative	Dams	Medium	2.0
Stafford	**Prevention - Processes to Mitigate Damages to Life & Property**	Develop action plan, time table and budget to repair dams	New Initiative	Dams	High	2.0
Stafford	**Prevention - Strengthen Planning & Development Regulations**	Enforce an ordinance prohibiting roadway obstructions	New Initiative	Snow	Medium	1.8
Stafford	**Prevention - Strengthen Planning & Development Regulations**	Continue to maintain zoning, subdivision and wetlands regulations current with best practices	New Initiative	Flood	High	1.8
Stafford	**Prevention - Strengthen Planning & Development Regulations**	Complete and implement stormwater management plan	New Initiative	Flood, Drought	Medium	1.8

Municipality	Type of Mitigation Measure	Strategic Action	Status of Action (See Municipal Plans Section for Additional Status Details)	Hazard Addressed*	Priority	Planning Level Benefit-Cost Ratio
Stafford	**Structural Projects - Improve Drainage, Culverts, Roads & Bridges**	Address priority bridge, culvert and other drainage projects identified in Capital Improvement Plan	New Initiative	Flood	High	1.3
Stafford	**Structural Projects - Protect/ Improve Utility Infrastructure**	Pursue opportunities to relocate wires where they are vulnerable: areas of repetitive power failure	New Initiative	Wind	Medium	0.9
Suffield	**Education & Awareness - Informational Public Outreach**	Conduct periodic educational outreach to residents on storm readiness and property	New Initiative	All	Medium	4.8
Suffield	**Natural Resource Protection - Preserve & Restore Natural Functions**	Encourage property owners to refrain from dumping debris into stream channels and drainage culverts.	New Initiative	Flood	Medium	1.3
Suffield	**Prevention - Assess Risks & Vulnerabilities**	Conduct a study to identify the worst areas of surface flooding and develop methods to alleviate the problem areas.	New Initiative	Flood	Medium	1.9
Suffield	**Prevention - Processes to Mitigate Damages to Life & Property**	Secure contractual tree removal services and equipment prior to storm response and cleanup.	New Initiative	All	Medium	2.0
Suffield	**Prevention - Processes to Mitigate Damages to Life & Property**	Preemptively clean debris out of select drainage structures before and during heavy storm events.	New Initiative	Flood	Medium	2.0
Suffield	**Prevention - Processes to Mitigate Damages to Life & Property**	Develop inspection program for culverts and other stormwater management structures.	New Initiative	Flood	Medium	2.0
Suffield	**Prevention - Strengthen Planning & Development Regulations**	Amend zoning regulations to require low impact development techniques in new development.	New Initiative	Flood, Drought	Medium	1.8
Tolland	**Education & Awareness - Informational Public Outreach**	Raise awareness in the community of the National Flood Insurance Program	Existing Action to be Continued in 2014-2019 Plan Update	Flood	Medium	4.8
Tolland	**Education & Awareness - Informational Public Outreach**	Use town website to communicate emergency planning information to residents	Existing Action to be Continued in 2014-2019 Plan Update	All	Medium	4.8
Tolland	**Natural Resource Protection - Preserve & Restore Natural Functions**	Educate commissioners, developers and the community on Low Impact Development	Existing Action to be Continued in 2014-2019 Plan Update	Flood, Drought	Medium	1.3

Municipality	Type of Mitigation Measure	Strategic Action	Status of Action (See Municipal Plans Section for Additional Status Details)	Hazard Addressed*	Priority	Planning Level Benefit-Cost Ratio
Tolland	**Preparedness - Enhance Relationships & Coordination to Improve Emergency Response**	Maintain agreements with private contractors for emergency tree service work	Existing Action to be Continued in 2014-2019 Plan Update	Wind, All	Medium	3.4
Tolland	**Preparedness - Enhance Relationships & Coordination to Improve Emergency Response**	Continue good communications with public safety officials in adjacent communities	Existing Action to be Continued in 2014-2019 Plan Update	All	Medium	3.4
Tolland	**Preparedness - Enhance Emergency Response: New Facilities, Equipment, Supplies, Personnel**	Purchase additional signs, barricades and related supplies for road closures and alternate-route marking	Existing Action to be Continued in 2014-2019 Plan Update	All	Medium	1.1
Tolland	**Prevention - Assess Risks & Vulnerabilities**	Analyze and make recommendations to improve natural and artificial drainage in Industrial Park and Gages Brook	Existing Action to be Continued in 2014-2019 Plan Update	Flood	Medium	1.9
Tolland	**Prevention - Assess Risks & Vulnerabilities**	Monitor CT DOT studies of Willimantic River (Depot/South River Road Bridge)	Existing Action to be Continued in 2014-2019 Plan Update	Flood	High	1.9
Tolland	**Prevention - Assess Risks & Vulnerabilities**	Inspect and evaluate the South River Road Bridge center pier and make recommendations for its improvement and/or maintenance	Existing Action to be Continued in 2014-2019 Plan Update	Flood	High	1.9
Tolland	**Prevention - Assess Risks & Vulnerabilities**	Identify private bridges that may need repair, and reach out to owners to determine best means of evaluating and implementing necessary upgrades	Existing Action to be Continued in 2014-2019 Plan Update	Flood	Medium	1.9
Tolland	**Prevention - Assess Risks & Vulnerabilities**	Analyze and make recommendations to improve Gehring Road crossing of Spice Brook	Completed Action from 2008 Plan	Flood		
Tolland	**Prevention - Assess/Protect Vulnerable Populations**	Develop and maintain list of special needs populations maintained by the Fire Department	Existing Action to be Continued in 2014-2019 Plan Update	All	High	2.3
Tolland	**Prevention - Processes to Mitigate Damages to Life & Property**	Develop a system for servicing/dredging fire ponds and dry hydrants periodically	Existing Action to be Continued in 2014-2019 Plan Update	Fire	Medium	2.0
Tolland	**Prevention - Processes to Mitigate Damages to Life & Property**	Investigate participation in the Community Rating System program.	Discontinued Action from 2008 Plan	Flood		
Tolland	**Prevention - Processes to Mitigate Damages to Life & Property**	Increase funding for preventive tree maintenance	Completed Action from 2008 Plan	Wind		2.0

Municipality	Type of Mitigation Measure	Strategic Action	Status of Action (See Municipal Plans Section for Additional Status Details)	Hazard Addressed*	Priority	Planning Level Benefit-Cost Ratio
Tolland	**Prevention - Strengthen Planning & Development Regulations**	Implement Low Impact Development regulations	Existing Action to be Continued in 2014-2019 Plan Update	Flood, Drought	High	1.8
Tolland	**Prevention - Strengthen Planning & Development Regulations**	Continue erosion and sedimentation control enforcement	Existing Action to be Continued in 2014-2019 Plan Update	Flood, Drought	Medium	1.8
Tolland	**Structural Projects - Acquisition/ Relocation**	Investigate purchase of campground located on Shenipsit Lake Road.	Discontinued Action from 2008 Plan	Flood		
Tolland	**Structural Projects - Improve Drainage, Culverts, Roads & Bridges**	Implement recommendations of Industrial Park study	Existing Action to be Continued in 2014-2019 Plan Update	Flood	Medium	1.3
Tolland	**Structural Projects - Improve Drainage, Culverts, Roads & Bridges**	Implement recommendations of South River Road Bridge analysis	Existing Action to be Continued in 2014-2019 Plan Update	Flood	Medium	1.3
Tolland	**Structural Projects - Improve Drainage, Culverts, Roads & Bridges**	Implement recommendations of Gehring Road study	Completed Action from 2008 Plan	Flood		
Tolland	**Structural Projects -Strengthen/ Protect Critical Facilities**	Secure funding for generator acquisition	Existing Action to be Continued in 2014-2019 Plan Update	All	Medium	1.6
Vernon	**Education & Awareness - Informational Public Outreach**	Conduct periodic educational outreach to residents on storm readiness and property maintenance issues	Existing Action to be Continued in 2014-2019 Plan Update	All	High	4.8
Vernon	**Education & Awareness - Targeted Outreach**	Conduct periodic outreach to private medical-care facilities and apartment complexes to encourage installation of generators	Existing Action to be Continued in 2014-2019 Plan Update	All	Medium	3.6
Vernon	**Preparedness - Enhance Emergency Response: New Facilities, Equipment, Supplies, Personnel**	Incorporate equipment needs in Capital Improvement Plan and pursue opportunities to upgrade equipment	Existing Action to be Continued in 2014-2019 Plan Update	Snow, All	Medium	1.1
Vernon	**Preparedness - Enhance Emergency Response: New Facilities, Equipment, Supplies, Personnel**	Pursue opportunities to obtain vehicles - through grants, surplus military equipment, etc	Completed Action from 2008 Plan	All		

Municipality	Type of Mitigation Measure	Strategic Action	Status of Action (See Municipal Plans Section for Additional Status Details)	Hazard Addressed*	Priority	Planning Level Benefit-Cost Ratio
Vernon	**Preparedness - Improve Communications Systems**	Improve public notification systems.	New Initiative	All	Medium	1.8
Vernon	**Preparedness - Improve Communications Systems**	Acquire telephones, computer server and back-up, mobile hand-held radios and enable wireless connections	Existing Action to be Continued in 2014-2019 Plan Update	All	Medium	1.8
Vernon	**Prevention - Assess Risks & Vulnerabilities**	Acquire weather monitoring system that provides real-time data and alerts to inform critical decision making for emergency preparedness and response operations.	New Initiative	All	High	1.9
Vernon	**Prevention - Assess Risks & Vulnerabilities**	Acquire water level monitoring system that provides real-time data and alerts to inform critical decision making for emergency preparedness and response operations.	New Initiative	Flood, Dams, All	Medium	1.9
Vernon	**Prevention - Assess Risks & Vulnerabilities**	Continue planning to implement GIS for use by all town departments, including emergency services	Existing Action to be Continued in 2014-2019 Plan Update	All	Medium	1.9
Vernon	**Prevention - Assess Risks & Vulnerabilities**	Study improvements to Franklin Road to prevent flooding of road.	Existing Action to be Continued in 2014-2019 Plan Update	Flood	Medium	1.9
Vernon	**Prevention - Assess Risks & Vulnerabilities**	Study improvements to Manchester Flats area (Route 83, Welles and Main Streets) to prevent area flooding.	Existing Action to be Continued in 2014-2019 Plan Update	Flood	Medium	1.9
Vernon	**Prevention - Assess Risks & Vulnerabilities**	Study improvements along Frederick Road to prevent area flooding.	Existing Action to be Continued in 2014-2019 Plan Update	Flood	Medium	1.9
Vernon	**Prevention - Processes to Mitigate Damages to Life & Property**	Complete the requirements to join FEMA's Community Rating System to reduce flood insurance premiums for residents	Existing Action to be Continued in 2014-2019 Plan Update	Flood	Medium	2.0
Vernon	**Prevention - Processes to Mitigate Damages to Life & Property**	Investigate CRCOG service sharing initiative for opportunities to share equipment used in tree maintenance	Existing Action to be Continued in 2014-2019 Plan Update	All	Medium	2.0
Vernon	**Structural Projects - Improve Drainage, Culverts, Roads & Bridges**	Upon completion of studies of problem drainage areas, prioritize and implement recommended improvements	Existing Action to be Continued in 2014-2019 Plan Update	Flood	Medium	1.3

Municipality	Type of Mitigation Measure	Strategic Action	Status of Action (See Municipal Plans Section for Additional Status Details)	Hazard Addressed*	Priority	Planning Level Benefit-Cost Ratio
Vernon	**Structural Projects -Strengthen/ Protect Critical Facilities**	Work with CREPC to identify grant programs for purchasing portable generators and modifying buildings for hook-up	Existing Action to be Continued in 2014-2019 Plan Update	All	High	1.6
West Hartford	**Preparedness - Enhance Emergency Response: New Facilities, Equipment, Supplies, Personnel**	Increase sheltering supplies (cots, water, food, etc.).	New Initiative	All	High	1.1
West Hartford	**Preparedness - Enhance Emergency Response: New Facilities, Equipment, Supplies, Personnel**	Establish pet sheltering alternatives.	New Initiative	All	Low	1.1
West Hartford	**Preparedness - Enhance Emergency Response: Training**	Provide Incident Command training to all personnel for position and function.	New Initiative	All	Medium	4.0
West Hartford	**Preparedness - Enhance Emergency Response: Training**	Provide shelter management training to all personnel for position and function.	New Initiative	All	Medium	4.0
West Hartford	**Preparedness - Enhance Emergency Response: Training**	Provide specific incident action plan development training to positions and functions of EOC representatives.	New Initiative	All	Medium	4.0
West Hartford	**Prevention - Processes to Mitigate Damages to Life & Property**	Ensure and supply transportation access to emergency shelters.	New Initiative	All	High	2.0
West Hartford	**Prevention - Processes to Mitigate Damages to Life & Property**	Ensure ability of the town to safely shelter in place, and when necessary,	New Initiative	All	High	2.0
West Hartford	**Prevention - Processes to Mitigate Damages to Life & Property**	Work with local fuel stations to ensure adequate emergency generating equipment for emergency response vehicles.	New Initiative	All	Medium	2.0
West Hartford	**Prevention - Processes to Mitigate Damages to Life & Property**	Continue to implement Repetitive Flood Loss Plan.	Existing 2008 Plan Action - Modified for 2014-19 Update	Flood	High	2.0
West Hartford	**Structural Projects -Strengthen/ Protect Critical Facilities**	Install generators at all primary and tertiary shelters and designated alternate care sites.	New Initiative	All	High	1.6
West Hartford	**Structural Projects -Strengthen/ Protect Critical Facilities**	Implement needed improvements to the Emergency Operations Center to withstand high wind and other natural and manmade disasters.	New Initiative	Wind, All	High	1.6

Municipality	Type of Mitigation Measure	Strategic Action	Status of Action (See Municipal Plans Section for Additional Status Details)	Hazard Addressed*	Priority	Planning Level Benefit-Cost Ratio
West Hartford	**Structural Projects -Strengthen/ Protect Critical Facilities**	Upgrade and enhance operational equipment in Emergency Operations Center including radio communications, satellite communications and visual display media.	New Initiative	All	Medium	1.6
West Hartford	**Structural Projects -Strengthen/ Protect Critical Facilities**	Identify and establish a secondary Emergency Operations Center.	New Initiative	All	Medium	1.6
Wethersfield	**Education & Awareness - Informational Public Outreach**	Educate residents on new flood zone maps via website, public access portals	Existing Action to be Continued in 2014-2019 Plan Update	Flood	Medium	4.8
Wethersfield	**Preparedness - Enhance Emergency Response: New Facilities, Equipment, Supplies, Personnel**	Replace/enlarge sand/salt storage facility	Existing Action to be Continued in 2014-2019 Plan Update	Snow	Medium	1.1
Wethersfield	**Preparedness - Enhance Emergency Response: New Facilities, Equipment, Supplies, Personnel**	Expand capacity for public works trucks and equipment storage	Existing Action to be Continued in 2014-2019 Plan Update	All	Medium	1.1
Wethersfield	**Prevention - Processes to Mitigate Damages to Life & Property**	Formulate tree maintenance plan based on inventory and integrate it into Public Works operating budget	Existing Action to be Continued in 2014-2019 Plan Update	All	Medium	2.0
Wethersfield	**Preparedness - Enhance Emergency Response: Training**	Investigate and train with City Hartford on operation of levee flood gates	New Initiative	Flood	Medium	4.0
Wethersfield	**Prevention - Assess Risks & Vulnerabilities**	Evaluate impact of flooding on Historic District significant buildings and provide protective measures.	New Initiative	Flood	Medium	1.9
Wethersfield	**Prevention - Assess Risks & Vulnerabilities**	Conduct a tree inventory	Existing Action to be Continued in 2014-2019 Plan Update	Wind, All	Medium/Low	1.9
Wethersfield	**Prevention - Assess Risks & Vulnerabilities**	Determine areas in Town with frequent outages	Existing Action to be Continued in 2014-2019 Plan Update	All	Medium	1.9
Wethersfield	**Prevention - Processes to Mitigate Damages to Life & Property**	Work with Connecticut Light & Power for aggressive tree pruning program	New Initiative	Wind, All	Medium	2.0
Wethersfield	**Prevention - Processes to Mitigate Damages to Life & Property**	Develop plan for relocating public works equipment in the event of flooding of Town Garage	Existing Action to be Continued in 2014-2019 Plan Update	Flood	Medium	2.0

Municipality	Type of Mitigation Measure	Strategic Action	Status of Action (See Municipal Plans Section for Additional Status Details)	Hazard Addressed*	Priority	Planning Level Benefit-Cost Ratio
Wethersfield	**Prevention - Processes to Mitigate Damages to Life & Property**	Explore participation in FEMA's Community Rating System program to reduce flood insurance premiums for residents	Existing Action to be Continued in 2014-2019 Plan Update	Flood	Medium	2.0
Wethersfield	**Prevention - Processes to Mitigate Damages to Life & Property**	Actively participate in and monitor planning and implementation of MDC's Clean Water Project	Existing Action to be Continued in 2014-2019 Plan Update	Flood	Medium	2.0
Wethersfield	**Prevention - Strengthen Planning & Development Regulations**	Ensure that any future development within town AG zone will not increase the risk of flooding and is built to withstand flooding	Existing 2008 Plan Action - Modified for 2014-19 Update	Flood	Medium	1.8
Wethersfield	**Structural Projects - Acquisition/ Relocation**	Consider relocation of public works facility out of flood hazard area	New Initiative	Flood	Medium	0.9
Wethersfield	**Structural Projects - Improve Drainage, Culverts, Roads & Bridges**	Pursue opportunities to implement further dredging and drainage projects through the capital improvement program and any other available funding sources	Existing Action to be Continued in 2014-2019 Plan Update	Flood	Medium	1.3
Wethersfield	**Structural Projects - Improve Drainage, Culverts, Roads & Bridges**	Improve natural and artificial drainage areas that affect road flooding	Existing Action to be Continued in 2014-2019 Plan Update	Flood	Medium	1.3
Wethersfield	**Structural Projects - Improve Drainage, Culverts, Roads & Bridges**	Investigate making improvements to channel and underground conduit of Folly Brook with Army Corps of Engineers	Existing Action to be Continued in 2014-2019 Plan Update	Flood	Medium	1.3
Wethersfield	**Structural Projects -Strengthen/ Protect Critical Facilities**	Consider full time emergency power generators at all MDC sewage pump stations	New Initiative	Wind, All	Medium	1.6
Wethersfield	**Structural Projects -Strengthen/ Protect Critical Facilities**	Consider full time emergency power generators at fuel tank distribution terminals	New Initiative	Wind, All	Medium	1.6
Wethersfield	**Structural Projects - Protect/ Improve Utility Infrastructure**	Work with Connecticut Light & Power to relocate distribution underground in repetitive outage areas, or harden facilities remaining overhead	Existing 2008 Plan Action - Modified for 2014-19 Update	Wind, All	Medium	0.9
Wethersfield	**Structural Projects -Strengthen/ Protect Critical Facilities**	Consider full time emergency power generators at all private cell service providers	New Initiative	Wind, All	Medium	1.6

Municipality	Type of Mitigation Measure	Strategic Action	Status of Action (See Municipal Plans Section for Additional Status Details)	Hazard Addressed*	Priority	Planning Level Benefit-Cost Ratio
		and at all shelters and back up shelters.				
Windsor	**Education & Awareness - Informational Public Outreach**	Conduct public information campaign on property maintenance with respect to flooding, wind, freezing and other hazards	Existing Action to be Continued in 2014-2019 Plan Update	All	Medium	4.8
Windsor	**Education & Awareness - Targeted Outreach**	Work with local hotels to ensure adequate emergency generating equipment to reduce reliance on municipal emergency shelters	Existing Action to be Continued in 2014-2019 Plan Update	All	Medium	3.6
Windsor	**Natural Resource Protection - Preserve & Restore Natural Functions**	Increase stormwater retention capacity	Existing Action to be Continued in 2014-2019 Plan Update	Flood, Drought	Medium	1.3
Windsor	**Preparedness - Enhance Emergency Response Procedures**	Evaluate alternative technologies for snow and ice removal	Existing Action to be Continued in 2014-2019 Plan Update	Snow	High	2.8
Windsor	**Preparedness - Enhance Emergency Response Procedures**	Review and install roadway management system to determine optimal time for liquid ice control application	Existing Action to be Continued in 2014-2019 Plan Update	Snow	Medium	2.8
Windsor	**Preparedness - Enhance Emergency Response: New Facilities, Equipment, Supplies, Personnel**	Increase sheltering capacity	Existing Action to be Continued in 2014-2019 Plan Update	All	Medium	1.1
Windsor	**Preparedness - Enhance Emergency Response: Training**	Increase training for hazard response, e.g. National Incident Management System (NIMS).	Existing Action to be Continued in 2014-2019 Plan Update	All	Medium	4.0
Windsor	**Prevention - Assess Risks & Vulnerabilities**	Map flooding extents from 1984, 2003 and 2005 incidents	Existing Action to be Continued in 2014-2019 Plan Update	Flood	Medium	1.9
Windsor	**Prevention - Processes to Mitigate Damages to Life & Property**	Prioritize watersheds based on historic negative impact	Existing Action to be Continued in 2014-2019 Plan Update	Flood	Medium	2.0
Windsor	**Prevention - Processes to Mitigate Damages to Life & Property**	Develop and implement maintenance plan for River Street retaining wall	Existing Action to be Continued in 2014-2019 Plan Update	Flood	Medium	2.0
Windsor	**Prevention - Processes to Mitigate Damages to Life & Property**	Develop and implement maintenance plan for stormwater facilities	Existing Action to be Continued in 2014-2019 Plan Update	Flood	Medium	2.0

Municipality	Type of Mitigation Measure	Strategic Action	Status of Action (See Municipal Plans Section for Additional Status Details)	Hazard Addressed*	Priority	Planning Level Benefit-Cost Ratio
Windsor	**Prevention - Processes to Mitigate Damages to Life & Property**	Pursue Community Rating System designation from FEMA	Existing Action to be Continued in 2014-2019 Plan Update	Flood	Medium	2.0
Windsor	**Structural Projects - Improve Drainage, Culverts, Roads & Bridges**	Implement identified improvements to Mill, Meadow and Deckers Brooks watersheds.	Existing Action to be Continued in 2014-2019 Plan Update	Flood	Medium	1.3
Windsor	**Structural Projects - Improve Drainage, Culverts, Roads & Bridges**	Identify, prioritize and implement local road improvements	Existing Action to be Continued in 2014-2019 Plan Update	Flood	Medium	1.3
Windsor	**Structural Projects - Improve Drainage, Culverts, Roads & Bridges**	Pursue improvements of state roads with the CT Department of Transportation	Existing Action to be Continued in 2014-2019 Plan Update	Flood	Medium	1.3
Windsor	**Structural Projects - Protect/ Improve Utility Infrastructure**	Support Metropolitan District Commission efforts to prevent flood water infiltration of sewer system	Existing Action to be Continued in 2014-2019 Plan Update	Flood	Medium	0.9
Windsor	**Structural Projects - Protect/ Improve Utility Infrastructure**	Bury power lines at public safety buildings	Existing Action to be Continued in 2014-2019 Plan Update	All	Medium	0.9
Windsor	**Structural Projects -Strengthen/ Protect Critical Facilities**	Consider and develop a secondary Emergency Operations Center	Existing Action to be Continued in 2014-2019 Plan Update	All	Medium	1.6
Windsor Locks	**Education & Awareness - Informational Public Outreach**	Work with school system to reach out to students/families to educate public	New Initiative	All	Medium	4.8
Windsor Locks	**Education & Awareness - Informational Public Outreach**	Use local advertising opportunities to educate public	New Initiative	All	Medium	4.8
Windsor Locks	**Structural Projects -Strengthen/ Protect Critical Facilities**	Provide generators for critical town facilities.	New Initiative	All	Medium	1.6
Windsor Locks	**Prevention - Strengthen Planning & Development Regulations**	Review, amend as necessary, and enforce land use regulations	Existing Action to be Continued in 2014-2019 Plan Update	All	Medium	1.8
Windsor Locks	**Structural Projects - Improve Drainage, Culverts, Roads & Bridges**	Address drainage issues on Kettle Brook at Middle School on Center Street	Existing Action to be Continued in 2014-2019 Plan Update	Flood	Medium	1.3

Municipality	Type of Mitigation Measure	Strategic Action	Status of Action (See Municipal Plans Section for Additional Status Details)	Hazard Addressed*	Priority	Planning Level Benefit-Cost Ratio
Windsor Locks	**Structural Projects - Improve Drainage, Culverts, Roads & Bridges**	Address drainage issues on Industrial Road	Existing Action to be Continued in 2014-2019 Plan Update	Flood	Medium	1.3
Windsor Locks	**Structural Projects - Improve Drainage, Culverts, Roads & Bridges**	Address drainage issues at West and Spring Streets	Existing Action to be Continued in 2014-2019 Plan Update	Flood	Medium	1.3
Windsor Locks	**Structural Projects - Improve Drainage, Culverts, Roads & Bridges**	Address drainage issues in the Smally Road area	Existing Action to be Continued in 2014-2019 Plan Update	Flood	Medium	1.3
Windsor Locks	**Structural Projects - Improve Drainage, Culverts, Roads & Bridges**	Address drainage issues on Bristol Road	Existing Action to be Continued in 2014-2019 Plan Update	Flood	Medium	1.3
Windsor Locks	**Structural Projects - Improve Drainage, Culverts, Roads & Bridges**	Address drainage issues at Dibble Hollow and Bel Air Circle	Existing Action to be Continued in 2014-2019 Plan Update	Flood	Medium	1.3
Windsor Locks	**Structural Projects - Improve Drainage, Culverts, Roads & Bridges**	Address drainage issues at Gaylord and Lowndes Drive	Existing Action to be Continued in 2014-2019 Plan Update	Flood	Medium	1.3
Windsor Locks	**Structural Projects - Improve Drainage, Culverts, Roads & Bridges**	Address drainage issues on Papermill Brook at Center Street/Whitton Street.	Completed Action from 2008 Plan	Flood		
Windsor Locks	**Structural Projects - Improve Drainage, Culverts, Roads & Bridges**	Address drainage issues at Chestnut and Main Streets.	Completed Action from 2008 Plan	Flood		

*Note: Wind hazards include hurricanes, tornados, and other high wind events. Snow also includes other winter storms such as ice storms. Other includes hazards not specifically evaluated in this Plan Update such as man-made disasters and solar activity.

Analysis of Mitigation Actions and Processes

In considering which projects, processes, and other measures to undertake in the upcoming plan period, municipal and regional officials evaluated the need to address problems and vulnerabilities in their communities against the communities' resources and capabilities. In the development of the 2008 Plan, CRCOG and municipal staff prioritized mitigation strategies according to a variation of the STAPLEE evaluation process recommended in FEMA's Developing the Mitigation Plan: Identifying Mitigation Actions and Implementation Strategies (April 2003). At that time, each strategy was scored according to the following criteria:

Social: Is the action socially acceptable (compatible with community values)?
Technical: Is the strategy technically feasible?
Administrative: Does the community have the capacity to implement and maintain the action?
Political: Is there public support to implement and maintain the action?
Legal: Does the community have the legal authority to implement the strategy?
Economic: Is the action cost-effective?
Environmental: Is the strategy consistent with environmental policies and goals?

During the plan update process, the STAPLEE method was again presented to municipal staff and regional planning committee members as a means for the communities to evaluate their current and proposed mitigation strategies and thus aid in setting priorities. Officials were asked to reassess existing projects which would remain in the plan update and evaluate new initiatives to terms of whether the projects were high priority ("Must Do"), medium priority ("Should Do"), or low priority ("Nice to Do"). While all projects proposed for the plan update were not specifically scored against the STAPLEE criteria, STAPLEE was presented as a means for helping determine priorities. (For additional details, see the Strategy Analysis and Prioritization discussion in Section V, Planning Process.)

The STAPLEE criteria also formed the basis for the evaluation of the planning level benefit-cost comparison of mitigation strategies. Benefit-Cost Ratios (BCRs) were prepared for projects based on the category or type of mitigation measures they represented. (See the previous discussion of types of mitigation measures.) Each type of measure was assigned a score related to its expected benefit and its expected cost to the community. The scoring system used is outlined in the table below:

Table 24: Benefit-Cost Ratio Scoring Definitions

Scoring	Benefits	Costs
Low: 0-1 points	**Few would benefit; the impacts being addressed are not severe; benefits may be short term.**	**Likely to be done by existing personnel with little impact on budget; Not complicated to accomplish. Costs to implement are likely to be under $10,000.**
Medium: 2-3 points	**Benefits may be felt by many in the community; the action may solve a problem or otherwise benefit the community for a number of years**	**May need additional funding or studies; May require change in practices; Costs to implement may be between $10,000 and $100,000**
High: 4-5 points	**Benefits would accrue to many in community; benefits may accrue to the most vulnerable or those not able to recover on their own; benefits would be long term and may permanently protect from damages.**	**Likely to cost over $100,000 and require obtaining funding outside of operating budget; complicated, lengthy process to implement**

The following charts present the calculated planning level benefit-cost ratios of the proposed municipal and regional mitigation measures respectively. These BCRs were calculated at the planning level prior to full analysis of all costs and benefits associated with implementation. The assumed costs of projects and the benefits accruing from them are not based on specific detailed cost estimates as that level of analysis is not appropriate for this type of planning effort. For some projects, such as routine or recurring operations that are established practices and conducted with municipal general operating funds and existing staff, this may be the only explicit comparison of costs and benefits. For projects for which bonding and/or grant funding will be sought, more in-depth evaluations of costs and benefits may be required. As project scopes are detailed, benefits and costs can be identified with more precision and the benefit cost ratio which results from a full benefit cost analysis may differ from the planning level BCR presented here. It should be noted that higher BCRs do not necessarily correspond to high priorities, nor do low BCRs or BCRs under 1.0 correspond to low priority projects. An important project with a high priority to the community may have a lower BCR because of its complexity, assumed high expense, and other costs. Communities should not be discouraged or deterred from further consideration of projects which have low BCRs or BCRs less than 1.0 until additional, more specific, evaluations of the costs and benefits have been undertaken.

Table 25: Benefit Cost Ratios for Municipal Mitigation Actions

Category of Strategy	Action Type	STAPLEE Factors:	SOCIAL	TECHNICAL	ADMINISTRATIVE	POLITICAL	LEGAL	ECONOMIC	ENVIRONMENTAL	Total Points	B/C Ratio
Education & Awareness	Informational Public Outreach	Benefits	4	4	4	5	4	4	4	29	4.8
		Costs	0	1	1	1	2	1	0	6	
	Targeted Outreach	Benefits	4	4	4	5	4	4		25	3.6
		Costs	1	1	1	1	2	1		7	
	Workshops and Forums	Benefits	3	4	4	4	4	4		23	3.8
		Costs	0	1	2	0	1	2		6	
Natural Resource Protection	Preserve & Restore Natural Functions	Benefits	3	4	3	3	3	4	4	24	1.3
		Costs	3	3	3	3	3	2	2	19	
	Timber Management	Benefits	3	4	3	3	3	4	4	24	1.4
		Costs	3	2	3	2	2	2	3	17	
Preparedness/ Emergency Response	Enhance Relationships & Coordination	Benefits	4	4	4	4	4	4		24	3.4
		Costs	1	1	2	1	1	1		7	
	Enhance Emergency Response through Training	Benefits	4	4	4	4	4	4		24	4.0
		Costs	2	1	1	0	1	1		6	
	New Facilities, Equipment, Supplies, Personnel	Benefits	3	4	4	3	4	3	3	24	1.1
		Costs	4	3	4	3	3	3	2	22	
	Enhance Emergency Response Procedures	Benefits	4	4	4	4	4	3	2	25	2.8
		Costs	2	1	2	1	1	1	1	9	
	Improve Communications Systems	Benefits	4	4	4	4	4	4		24	1.8
		Costs	3	1	3	1	2	3		13	
Prevention	Assess Risks & Vulnerabilities	Benefits	4	4	3	3	4	3		21	1.9
		Costs	0	1	3	3	1	3		11	
	Assess/Protect Vulnerable Populations	Benefits	4	3	4	4	3	3		21	2.3
		Costs	1	1	3	1	2	1		9	
	Mitigation Processes	Benefits	4	4	4	3	4	4	3	26	2.0
		Costs	2	1	2	2	2	2	2	13	
	Strengthen Planning & Development Regulations	Benefits	4	4	4	3	4	4	4	27	1.8
		Costs	2	2	3	3	2	2	1	15	
Structural Projects/ Modifications	Acquisition/ Relocation	Benefits	2	4	3	2	4	3	4	22	0.9
		Costs	4	3	4	3	4	4	2	24	
	Improve Drainage, Culverts, Roads & Bridges	Benefits	3	4	4	3	4	3	4	25	1.3
		Costs	3	2	3	3	2	3	3	19	
	Protect/Improve Utility Infrastructure	Benefits	3	3	3	3	2	3	3	20	0.9
		Costs	4	3	3	3	3	3	3	22	
	Strengthen/Protect Critical Facilities	Benefits	4	4	4	4	4	3	2	25	1.6
		Costs	2	1	2	3	2	3	3	16	

Table 26: Benefit Cost Ratios for Regional Mitigation Actions

Regional Objective	Action Type	STAPLEE Factors:	SOCIAL	TECHNICAL	ADMINISTRATIVE	POLITICAL	LEGAL	ECONOMIC	ENVIRONMENTAL	Total Points	B/C Ratio
Improve stormwater management and ground water recharge	Encourage municipal adoption of DEEP recommended practices	Benefits	4		4	4	4	4	4	24	4.8
		Costs	1		1	1	1	1	0	5	
	Advocate through development referrals reviews	Benefits	4		4	4	4		4	20	5.0
		Costs	1		1	1	1		0	4	
	Educate municipal staff and commissions	Benefits	4	4	4	4	4	4	4	28	4.7
		Costs	1	1	1	1	1	1	0	6	
	Participate in CT River Bi-State Partnership	Benefits	4	4	3	4	4	3	4	26	2.0
		Costs	1	1	3	3	2	2	1	13	
Assist municipalities in implementing hazard mitigation strategies	Maintain & Update Regional Natural Hazards Mitigation Plan	Benefits	4	4	4	4	4	3	4	16	2.0
		Costs	1	2	4	2	1	3	1	8	
	Improve availability of data	Benefits	4	4	4	3	4	4		23	1.8
		Costs	0	3	3	3	1	3		13	
	Train CRCOG staff on Hazus-MH	Benefits		4	4		4	4		16	2.0
		Costs		2	3		1	2		8	
	Assist municipalities in seeking funding for mitigation measures	Benefits	4	4	4	4	4	4		24	2.7
		Costs	1	1	3	1	1	2		9	
	Incorporate natural hazard mitigation into plans of conservation & development	Benefits	4	4	4	4	4	4	4	28	3.5
		Costs	1	1	2	1	1	1	1	8	
	Encourage municipalities to participate in CRS	Benefits	4	4	4	3	4	4	4	27	3.0
		Costs	1	1	2	3	1	1	0	9	
	Work to improve communications regarding dams	Benefits	4	4	3	3	3	3	4	24	1.8
		Costs	1	2	2	3	2	2	1	13	
	Encourage use of Get Ready Capitol Region website	Benefits	4	4	4	4	4	4		24	4.0
		Costs	2	2	1	0	0	1		6	
	Encourage FEMA to recognize cumulative effect of winter storms	Benefits	4	3	3	4	3	2		19	1.5
		Costs	1	3	3	2	1	3		13	
	Assist municipalities in efforts involving functional needs populations	Benefits	5	4	4	4	3	4		24	2.2
		Costs	2	2	2	1	2	2		11	
Assist municipalities in minimizing risks associated with power disruptions.	Monitor state efforts to address municipal concerns regarding CL&P	Benefits	4	4	4	4	4	4		24	4.0
		Costs	1	1	1	1	1	1		6	
	Encourage installation of generators	Benefits	4	4	3	3	3	3		20	1.7
		Costs	2	1	2	3	3	1		12	
Assist municipalities in minimizing risks associated with droughts.	Assist municipalities to enact drought ordinances	Benefits	4	4	4	3	4	4	4	27	3.0
		Costs	1	1	1	3	1	1	1	9	
	Assist municipalities in outreach to public regarding drought issues	Benefits	4	4	4	4	4	4	4	28	3.5
		Costs	1	1	2	1	1	1	1	8	

Section IV: Municipal Plans

Andover

Andover is a rural community on the eastern edge of the Capitol Region with a population of about 3,300. The town is approximately 15.7 square miles and has an elevation of about 400 feet above sea level. Andover is located in the Willimantic Watershed. Several small rivers and streams flow through the town including the Hop and Skungamaug Rivers and their tributaries: Burnap and Staddle Brooks. Bear Swamp Brook runs through the Nathan Hale State Forest located in the northeast corner of town. The State owned Bishop's Conservation Area is located in the southwest corner of town and includes the 53-acre Bishop Swamp Pond. Andover Lake is a 155-acre lake in the southeast corner that provides recreational opportunities to members of the private association that owns it. The Doris Chamberlain Nature preserve with small pond and walking trails is located on Route 316 near School Road. The major transportation routes through Andover include state routes 6, 87, and 316. Principal industries include agriculture and small wood and machine shops.

Route 6 through Andover and the neighboring towns of Bolton and Coventry was a recent focus of a transportation corridor study and review of economic development opportunities. As a follow-up to this study, the town anticipates reviewing its zoning regulations to consider revisions which could encourage commercial development at appropriate locations in the corridor.

Challenges

Storm damage from trees resulting in road blockages, power outages and debris accumulation is a major concern of the Town. Andover also contains significant forested land, including State Forest land, which poses some fire risk to residential areas. Andover is the smallest of the Capitol Region municipalities, has a limited staff and budget, and relies on a volunteer fire department. Nonetheless, the town has established working relationships with neighboring towns for assistance when needed.

The Town has two areas of localized flooding concern: Bunker Hill Road and the bridge over Hop River, and the bridge on Long Hill Road over the Hop River. Debris accumulation and erosion of stream banks are the main contributors to flooding problems at those locations. The National Flood Insurance Program has paid four property damage claims in Andover totaling $4,980.94 to-date. The Town has not permitted any new construction in the special flood hazard area. Andover has had no Repetitive Loss Property claims to-date. Although flooding is not as large a concern in Andover as in some other communities, a significant flood event could result in much damage. CRCOG used FEMA's Hazus-MH model to analyze the risks that the Town of Andover might face from flooding. The model estimates that economic losses to the town including residential and commercial damage and business interruptions due to a flood having a 1% chance of occurring any given year (the 100-year flood) would be over $10 million. The impacts of such a flood are summarized below:

Estimated Damages from 100-Year Flood	Households Displaced	57
	People Needing Shelter	40
	Buildings at Least Moderately Damaged	8
	Total Estimated Economic Losses	$10,290,000
	Total Residential Building & Content Losses	$5,870,000
	Total Commercial, Industrial & Other Building & Content Losses	$4,400,000
	Total Business Interruption Losses	$20,000

CRCOG also used FEMA's Hazus-MH model to analyze the risks that the Town of Andover might face from a hurricane as powerful as the 1938 hurricane. The model estimates that economic losses to the town including residential and commercial damage and business interruptions due to such a Category 3 hurricane would be nearly $15 million. The impacts of such a storm are summarized below:

Estimated Damages from a 1938 Strength Hurricane	Households Displaced	0
	People Needing Shelter	0
	Buildings at Least Moderately Damaged	126
	Buildings Completely Damaged	6
	Total Estimated Economic Losses	$14,800,000
	Total Residential Building Losses	$12,660,000
	Total Commercial, Industrial & Other Building Losses	$990,000
	Total Business Interruption Losses	$1,150,000
	Total Debris Generated	28,188 tons
	Truckloads (at 25 tons/truck) of building debris	44

According to information from the Connecticut Department of Emergency Management and Homeland Security, the three federally declared natural disasters of 2011 resulted in total expenses to the municipality and local and private nonprofit agencies of $75,218.43. These expenses include debris and snow removal, emergency protective measures and repairs to damaged infrastructure and buildings but do not include damages experienced by private citizens and businesses.

2011 Disasters Damage Amounts Eligible for 75% Reimbursement Under FEMA Public Assistance Program				
Applicant: Municipality and Other (Other = Fire Districts, Schools, Private Non-Profit Agencies)	**100% of Amount Eligible for 75% Reimbursement**			**Total Damages Eligible for Public Assistance Due to 2011 Disasters**
	DR-1958-CT 2011 Snow	**DR-4023-CT Irene August 2011**	**DR-4046-CT Severe Weather Oct 2011 (Alfred)**	
Town of Andover	$20,262.29	$21,914.70	$12,205.65	$54,382.64
Andover Other	$3,250.81	$15,757.65	$1,827.33	$20,835.79
Andover Total	**$23,513.10**	**$37,672.35**	**$14,032.98**	**$75,218.43**

Goals, Objectives and Strategies

GOAL: MINIMIZE LOSS OF LIFE, PROPERTY DAMAGE, AND COMMERCIAL DISRUPTION AND FACILITATE RECOVERY FROM NATURAL HAZARDS.

Objective 1:
Improve warning notification through Reverse-911 and evacuation assistance.

Strategic Actions

1.1 Monitor implementation of Reverse-911 system, and plan for updates.
Lead: Emergency Management
Priority: Medium
Status: In the 2008 Plan, this action referred to the implementation of the Tolland County TN 911 dispatch system. This system's set up is complete now. It is recommended that this mitigation activity remain in the plan, however to address any available updates for Andover.
Potential Funding Sources: General budget funds will be used for updates.
Timeframe: 2014-2019

1.2 Educate the public on new warning notification system, sheltering facilities and other emergency preparedness measures.
Lead: Emergency Management
Priority: Medium
Status: CERT notified town residents through door to door notifications, social media updates, and signs at strategic locations throughout town. The Board of Education uses call out notifications to parents in the event of emergencies such as snow storms. It is recommended that this activity be continued.
Potential Funding Sources: General budget funds will be used to continue efforts. The town will investigate grant funding to acquire Everbridge for call out notifications.
Timeframe: 2014-2019: Outreach efforts will be made prior to storm events on an as needed basis throughout the 2014-2019 plan period. Also periodic public notifications will be made in the local weekly publication, River East.

1.3 Coordinate with municipal agent for the elderly on special needs population list maintenance.
Lead: Emergency Management/Agent for the Elderly
Priority: Medium
Status: CERT compiled list of vulnerable persons several years ago. It is recommended that this activity be continued.
Potential Funding Sources: General budget funds will be used to continue efforts.
Timeframe: 2014-2019: Annual reviews of the list

Objective 2:
Ensure adequate natural hazard response and recovery through zoning and public works activities.

Strategic Actions:

2.1 Areas draining into the Hop River will be monitored to identify and prevent future erosion.
Lead: Public Works
Priority: Medium
Status: In the 2008 Plan, this project was described as: *Study and implement improved bank stabilization measures near bridge on Long Hill Road.* State inspections have been conducted and the bridge is considered in good repair. It is

recommended that this mitigation action be modified to address additional areas along the Hop River.

Potential Funding Sources: General budget funds

Timeframe: 2014-2019: Periodic inspections will be made during the course of normal public works operations.

2.2 Study debris and flooding issues on Parker Bridge Road.

Lead: Public Works

Priority: Medium

Status: Parker Road Bridge is located in Columbia and Coventry. Flooding on Parker Bridge Road has not been an issue in Andover. It is recommended to remove this activity from the plan.

2.3 Educate property owners on property maintenance, especially around natural and artificial drainage systems.

Lead: Public Works, Emergency Management

Priority: Medium

Status: Public works contacts property owners of specific problems as needed. Proposed subdivisions and first cuts are reviewed for their drainage impacts. It is recommended that be continued. Applications for development are to be reviewed through the site plan and subdivision process for drainage impacts.

Potential Funding Sources: General budget funds

Timeframe: 2014-2019

2.4 Establish a list of, and agreements with, private tree service companies to ensure prompt debris removal service following storms.

Lead: Public Works

Priority: Medium

Status: The list has been established and is periodically updated; agreements are made as required.

Potential Funding Sources: General budget funds

Timeframe: 2014-2019: Annual reviews during the budget process

2.5 Investigate the CRCOG service sharing initiative, especially surrounding tree and other debris removal equipment.

Lead: Public Works, Selectmen

Priority: Medium

Status: Andover has used regional service sharing for road salt and will investigate use of additional services if there are cost savings. The town maintains mutual agreements with neighboring towns for plowing and other services such as brush removal. It is recommended that this activity be continued.

Potential Funding Sources: General budget funds

Timeframe: 2014-2019: Service sharing agreements will be considered as available during the 2014-2019 plan period. The town participates several times a year at COST (Council of Small Towns), CCM and CRCOG meetings related to service sharing opportunities.

Objective 3:
Ensure capacity for emergency sheltering of residents.

Strategic Actions:

3.1 Improve shelter facility, especially sanitary facilities, handicapped accessibility and generator.
Lead: Emergency Management
Priority: Medium
Status: The Congregational Church and Town elementary school were used as an additional emergency shelters in the last two years. It is recommended that this activity be continued to address the need for a generator for the Town Hall addition.
Potential Funding Sources: Grant funding will be investigated.
Timeframe: 2014-2016

3.2 Investigate animal sheltering alternatives.
Lead: Emergency Management
Priority: Low
Status: In the 2008 Plan, it was proposed to *Investigate pet sheltering alternatives*. The opportunity for this was reviewed and the animal shelter/dog pound was improved in 2010 to allow this facility to be used for sheltering animals during emergency situations. For the Plan Update, it is recommended that this activity be restated so that additional opportunities for sheltering larger animals such as horses can be pursued.
Potential Funding Sources: General budget funds
Timeframe: Next three years (2014-2017).

Objective 4:
Train first responders and provide proper support, including supplies and equipment.

Strategic Actions:

4.1 Continue to participate in National Incident Management System (NIMS) training.
Lead: Emergency Management, Public Safety
Priority: High
Status: Andover was the site of a NIMS small town training drill in August 2012; the Town has also participated in statewide drills. New radios were purchased in 2013 for CERT volunteers. It is recommended that this activity be continued as opportunities are available.
Potential Funding Sources: Funding for NIMS is provided by FEMA.
Timeframe: 2014-2019

4.2 Coordinate with DEEP on maintenance of the Andover Lake Dam and of state forest land for structural integrity of dam, wild fire prevention and emergency response.
Lead: Fire and Emergency Management
Priority: Medium (The town reassessed the priority assigned to this project in 2008, raising it from Low to Medium.)

Status: Town land is under a forestry plan which includes periodic cutting and vegetation removal. Active coordination with DEEP has not been pursued to-date. It is recommended that efforts to meet with the state be pursued.

Potential Funding Sources: State funding to address state lands and facilities. Town efforts are self-funded from the harvesting of trees.

Timeframe: 2015-2019

Objective 5:

Ensure residents are aware of the gas pipeline that runs through town.

Strategic Action:

5.1 Coordinate with pipeline owner on public education and outreach regarding line and public safety.

Lead: Emergency Management

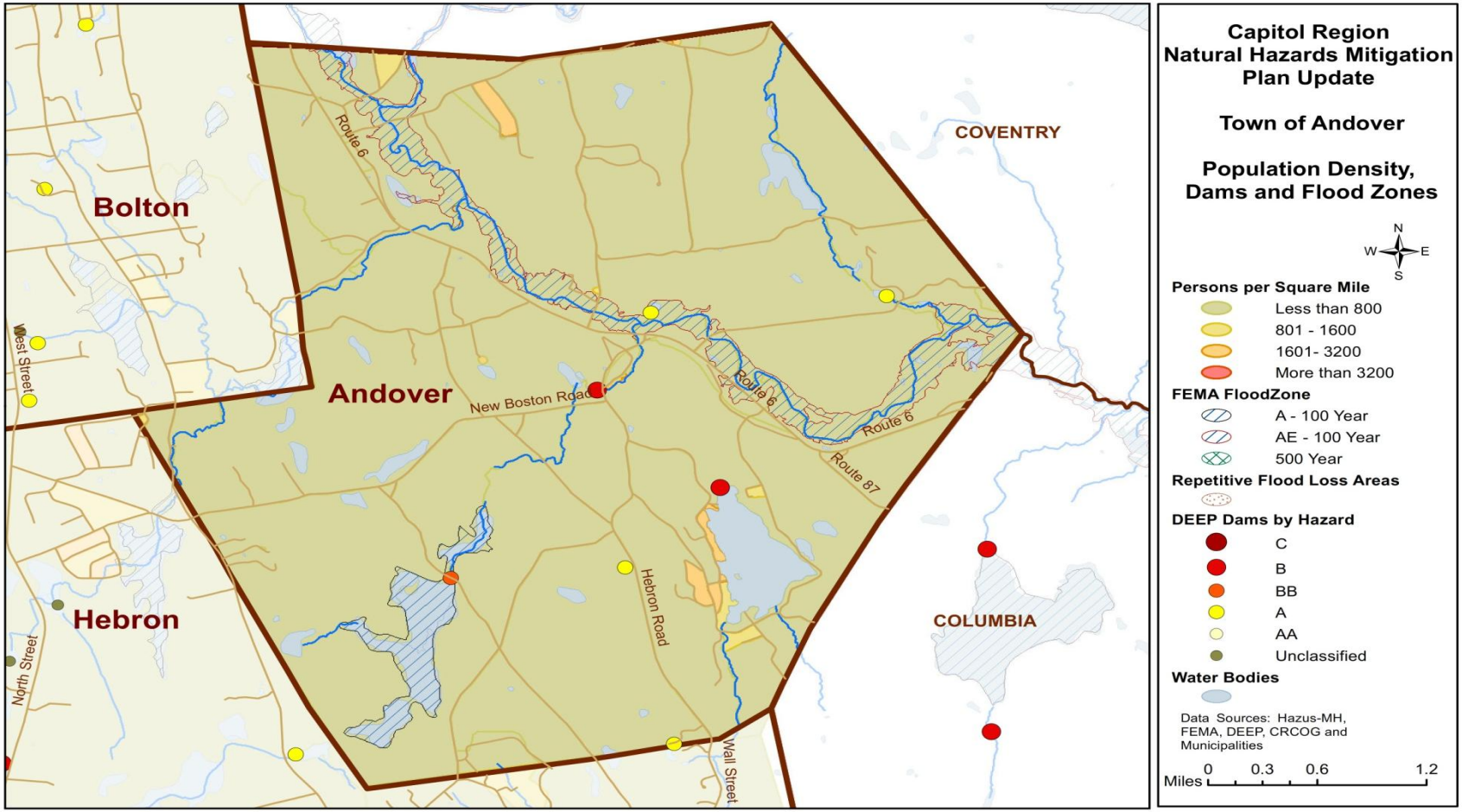
Priority: Low

Status: Algonquin Pipeline Company, owner of the pipeline, has conducted several outreach efforts to public officials. It is recommended that this activity be continued particularly with outreach to first responders.

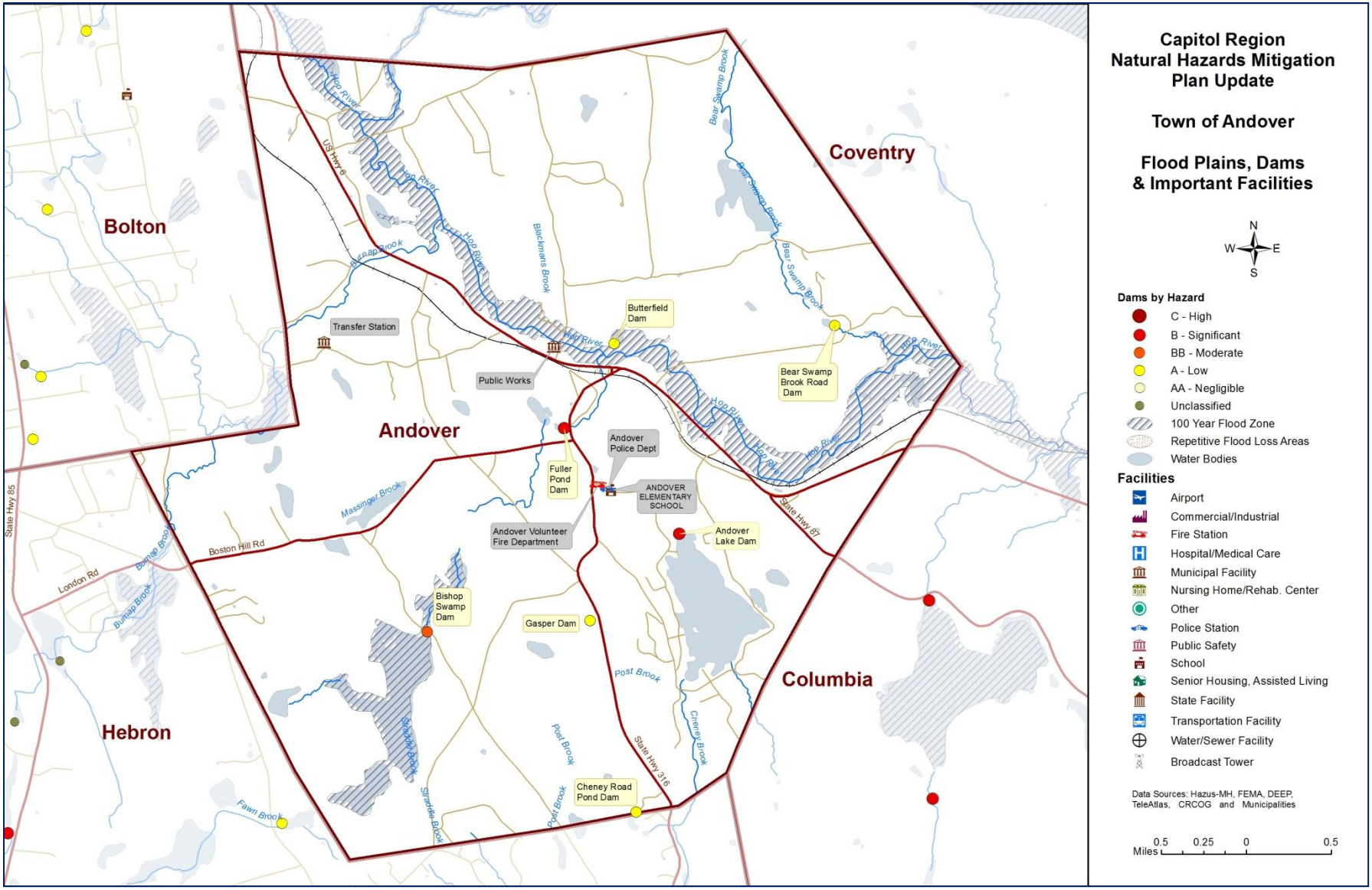
Potential Funding Sources: Private (Gas Company)

Timeframe: 2014-2019: Annual seminars to be conducted by the gas company

Map 10: Andover Population Density, Dams and Flood Zones



Map 11: Andover Flood Plains, Repetitive Loss Areas, Dams and Important Facilities



Avon

Avon is a suburban town in north-central Connecticut with a population of about 18,000. It has an average elevation of about 350 ft. The Town encompasses 23.5 square miles, lying entirely within the Farmington River watershed. The Farmington River forms the Town's western border then makes a u-turn in neighboring Farmington, to flow south to north in the eastern section of Avon. Major tributaries that course through Town include Big, Chidsey, Cider, Hawley, Nod, Roaring, Thompson, and Wiggin Brooks. Major state routes that pass through Avon include Routes 10 and 44. Insurance, printing, concrete products, poultry processing, reflective tapes, fiber optics and medical facilities are the major industries in Avon.

Challenges

Flooding and wintery weather can easily disrupt the transportation network in Avon, given the vast floodplain area and the steep terrain on the eastern edge of Town. Town staff also lack some basic resources to target mitigation and/or response measures, e.g. maps of structures in the floodplain and maps of Metropolitan District Commission (MDC) infrastructure that can be shared among public safety, planning, engineering and public works departments; however efforts have been made over the past five years to improve the Town's mapping capabilities.

Flooding is a concern for the Town of Avon and it has taken steps to reduce its vulnerability. No new development or changes in land use have been approved recently in the floodplain. Addressing repetitive flood claims is another challenge for the Town of Avon and its property owners. Among the property owners in Avon with flood insurance, three properties have filed multiple claims amounting to total payments of $45,197. These repetitive flood claims make up most of the total flood loss claims filed in Avon. Overall, the National Flood Insurance Program (NFIP) has paid 15 claims in Avon totaling over $50,000 to-date.

CRCOG used FEMA's Hazus-MH model to analyze the risks that the Town of Avon might face from a major flood. The model estimates that economic losses to the town including residential and commercial damage and business interruptions due to a flood having a 1% chance of occurring any given year (the 100-year flood) would be nearly $180 million. The impacts of such a flood are summarized below:

Estimated Damages from 100-Year Flood	Households Displaced	312
	People Needing Shelter	673
	Buildings at Least Moderately Damaged	114
	Total Estimated Economic Losses	$179,770,000
	Total Residential Building & Content Losses	$45,310,000
	Total Commercial, Industrial & Other Building & Content Losses	$133,460,000
	Total Business Interruption Losses	$970,000

Losses from strong hurricanes would also be significant. The model estimates that economic losses to the town including residential and commercial damage and business interruptions due to a Category

3 hurricane such as the 1938 Hurricane would be nearly $70 million. The impacts of such a storm are summarized below:

Estimated Damages from a 1938 Strength Hurricane	Households Displaced	19
	People Needing Shelter	2
	Buildings at Least Moderately Damaged	372
	Buildings Completely Damaged	15
	Total Estimated Economic Losses	$69,000,000
	Total Residential Building Losses	$51,100,000
	Total Commercial, Industrial & Other Building Losses	$11,200,000
	Total Business Interruption Losses	$6,700,000
	Total Debris Generated	30,082 tons
	Truckloads (at 25 tons/truck) of building debris	220

According to information from the Connecticut Department of Emergency Management and Homeland Security, the three federally declared natural disasters of 2011 resulted in total expenses to the municipality of nearly $2.6 million. These expenses include debris and snow removal, emergency protective measures and repairs to damaged infrastructure and buildings but do not include damages experienced by private citizens and businesses. Storm Alfred, by far, wreaked the most havoc on the town.

2011 Disasters Damage Amounts Eligible for 75% Reimbursement Under FEMA Public Assistance Program				
Applicant	**100% of Amount Eligible for 75% Reimbursement**			**Total Damages Eligible for Public Assistance Due to 2011 Disasters**
	DR-1958-CT 2011 Snow	**DR-4023-CT Irene August 2011**	**DR-4046-CT Severe Weather Oct 2011 Alfred)**	
Town of Avon	**$60,686.78**	**$148,578.36**	**$2,388,663.29**	**$2,597,928.43**

Goals, Objectives and Strategies

GOAL: REDUCE THE LOSS OF LIFE AND PROPERTY AND CONSEQUENCES AS A RESULT OF NATURAL DISASTERS

Objective 1:
Have a plan for emergency responders to respond to high winds.

Strategic Actions:

1.1 Develop and maintain agreements with local contractors for emergency tree and debris removal, to quickly restore access throughout town, for emergency response.
Lead: Public Works
Priority: Medium
Status: No agreement has been made. Service purchase approval process has been developed.

Potential Funding Source: General funds
Timeframe: 2014 – 2019

Objective 2:
Improve emergency responders' knowledge of emergency action plans.

Strategic Actions:

2.1 Continue to participate in regional National Incident Management System (NIMS) and other emergency response trainings.
Lead: Police and Fire
Priority: High
Status: Staff has updates as required; new staff continues to train.
Potential Funding Source: FEMA funding through CRCOG and General funds.
Timeframe: Periodically, as available during the 2014 – 2019

2.2 Inform municipal staff of revisions to emergency response action plan.
Lead: Emergency Management
Priority: High
Status: All departments have updated their plan annexes and have access to the EOP. The plan is routinely updated due to staff changes and new procedures.
Potential Funding Source: General funds
Timeframe: 2014 – 2019

Objective 3:
Ensure equipment is maintained in proper operative condition.

Strategic Actions:

3.1 Fully implement new fleet management system.
Lead: Public Works
Priority: High
Status: Completed. System is operating and managed by Public Works.

3.2 Investigate CRCOG services sharing initiative, and potential for shared equipment, such as a chipper.
Lead: Public Works, Administration
Priority: Medium
Status: Completed. Equipment has been purchased for regional use, Skid steer, and mini-excavator.

GOAL: REDUCE THE LOSS OF LIFE AND PROPERTY DURING ADVERSE WEATHER CONDITIONS

Objective 1:
Monitor weather conditions and relocate personnel in key locations to lower response times.

Strategic Actions:

1.1 Continue with current practices of relocating personnel to the east side of the Farmington River as needed.
Lead: Fire and Police
Priority: High
Status: This is an established practice which is implemented on an as needed basis. The Town has also developed an automatic response plan with UCONN Fire Department.
Potential Funding Source: Funds are not required; UCONN response is provided through mutual aid.
Timeframe: 2014-2019.

1.2 Use Connecticut Department of Transportation highway garage as staging area for local personnel.
Lead: Fire and Police
Priority: High
Status: This action was previously stated as *Talk to CT Department of Transportation about using State highway garage as staging area for local personnel*. This action was accomplished. Units can be staged if necessary. The Town will continue to maintain a working relationship with ConnDOT and will use the garage for staging on an as needed basis throughout the 2014-2019 plan period.
Potential Funding Source: Not required (State and Local staff will implement.)
Timeframe: 2014-2019

1.3 Provide satellite televisions for Public Works and Fire Departments to monitor information when power and cable are out.
Lead: Fire, Public Works
Priority: Medium
Status: Completed. Police and Fire Departments have satellite TV.

Objective 2:
Ensure adequate staffing and provide staff with necessary tools to respond to event.

Strategic Actions:

2.1 Upgrade more staff members to wireless communication systems.
Lead: Emergency Management

Priority: Medium
Status: Completed. All EOC staff have smart phones; many have laptops w/wifi.

2.2 Implement web-based GIS, and provide access to sensitive information for emergency responders.
Lead: Emergency Management, Planning
Priority: Low
Status: Complete. We have a web based program known as Community Explorer Online (CEO) available to all responders. Continual and ongoing updates to the system will be made as plan program changes.

2.3 Map structures located in floodplains, and develop a targeted Reverse-911 list for those property owners.
Lead: Engineering
Priority: Low
Status: GIS staff continues to develop data. Continual development and updates to the system will be made throughout the 2014 – 2019 planning period.
Potential Funding Source: General funds
Timeframe: 2014-2019

2.4 Acquire a portable generator and enable hook-ups at shelters and emergency response facilities.
Lead: Emergency Management
Priority: Low
Status: Completed. All public safety facilities have backup generators; however, two communication sites have been identified as needing generators. Main shelter site is equipped with backup power.
Potential Funding Source: General fund, grants
Timeframe: Project is expected to be initiated between 2014 and 2018. Completion will follow receipt of funding - estimated to be 2015-2019.

Objective 3:
Coordinate with all local, state and federal agencies and authorities.

Strategic Actions:

3.1 Map, or obtain mapping of, MDC infrastructure in town.
Lead: Planning
Priority: Low
Status: This is an established practice. Engineering is attempting to get data from MDC. Continual development and updates to the system will be made throughout the 2014 – 2019 planning period.
Potential Funding Source: General funds
Timeframe: 2014-2019

3.2 Meet with MDC staff to discuss coordinated emergency response planning.
Lead: Emergency Management
Priority: Medium
Status: Participated in MDC yearly drills; Engineering is attempting to get data from MDC. Will continue to maintain a working relationship with MDC and will participate in future drills throughout the 2014 – 2019 planning period.
Potential Funding Source: General funds
Timeframe: 2014-2019

3.3 Coordinate with other agencies on an as needed basis.
Lead: Emergency Management
Priority: Low
Status: This is an established practice.
Potential Funding Source: General funds
Timeframe: 2014 – 2019

GOAL: REDUCE THE LOSS OF LIFE AND PROPERTY DURING SIGNIFICANT FLOODING EVENTS

Objective 1:
Continue to enforce the towns of Avon's flood plain regulations.

Strategic Actions:

1.1 Continue with current development review and enforcement practices.
Lead: Planning, Engineering
Priority: High
Status: Regulations require structures be built above the 500' flood zone. Proposed development is routinely evaluated for conformance with floodplain regulations during the development review process. This practice will continue throughout the 2014-2019 plan period.
Potential Funding Source: General funds
Timeframe: 2014-2019

Note: the following strategy was in the 2008 Plan but will not be identified as a separate action in the 2014-2019 Update.

1.2 Ensure that an equal amount of compensation for any project that negatively affects flood flows.
Lead: Planning, Engineering
Priority: High

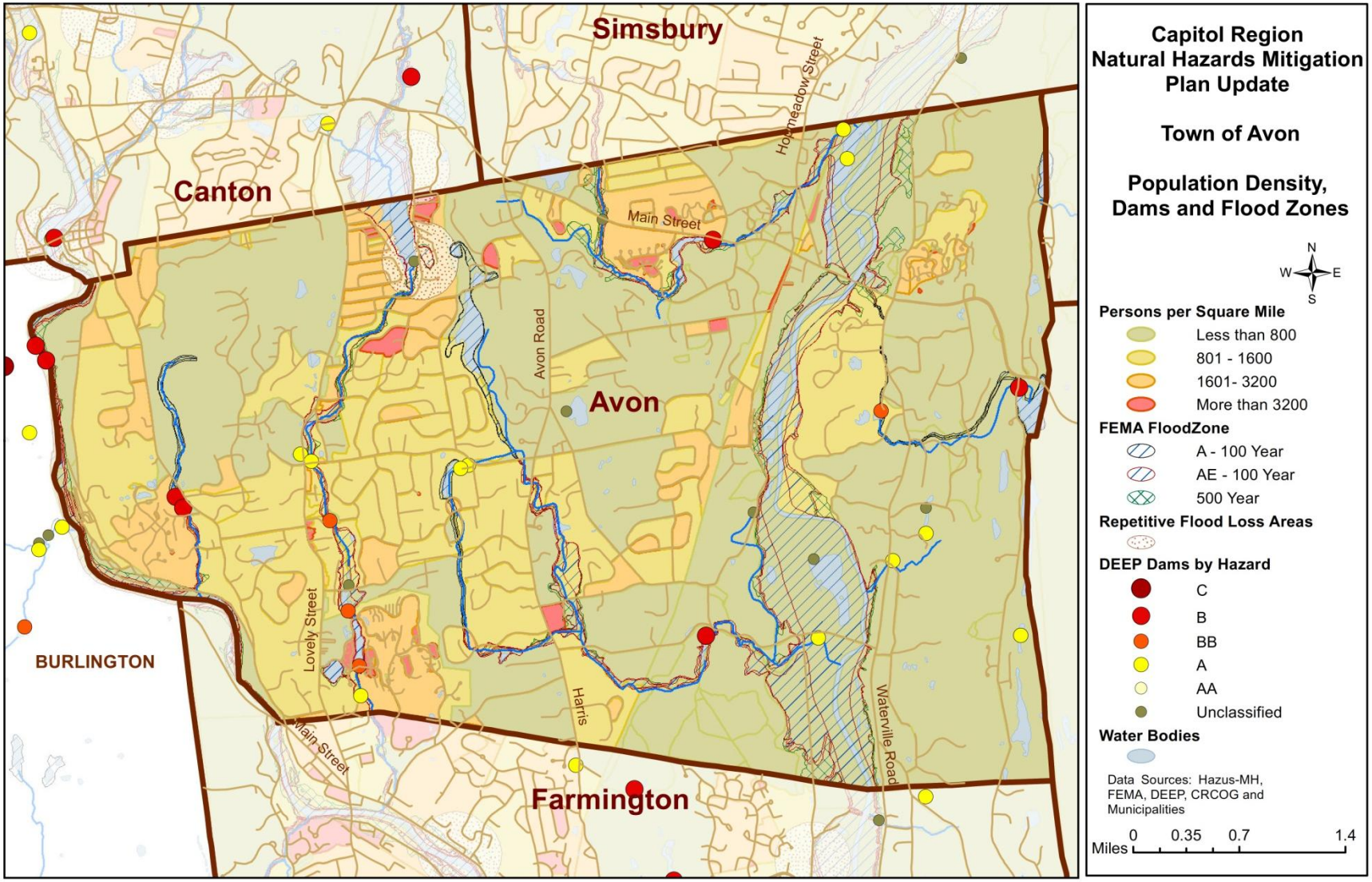
Status: Proposed development in the floodplain is required to be constructed in accordance with the Town's floodplain regulations, including compensatory storage. Implementation of this strategy is covered within the strategic action above (*1.1 Continue with current practices*). For this reason, the Town has opted not to include this as a separate strategic action for the update.

Objective 2:
Educate public in regards to town's emergency plan and emergency shelter.

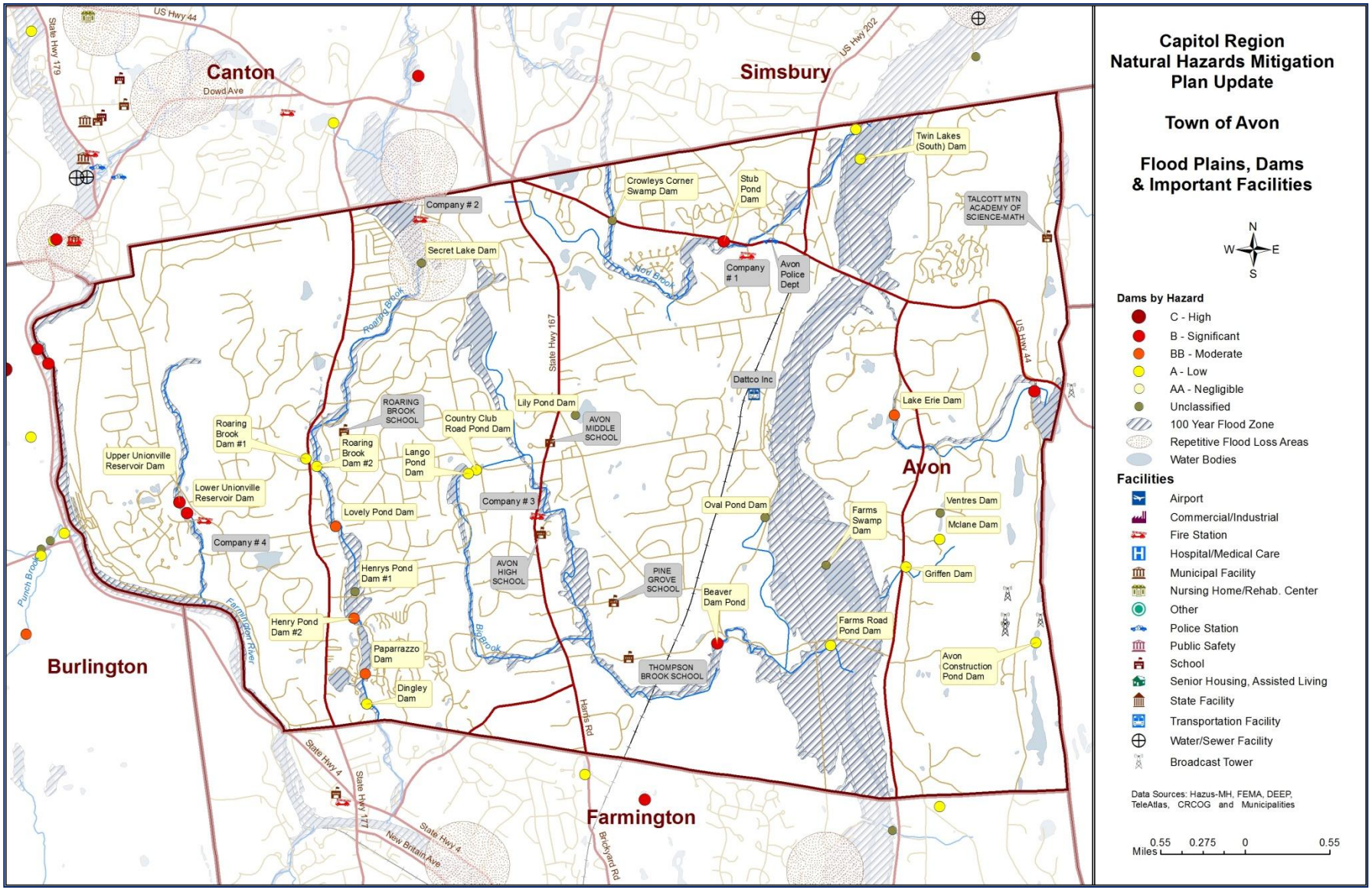
Strategic Actions:

2.1 Use municipal website and town newsletter to periodically update residents.
Lead: Emergency Management
Priority: Medium
Status: The Town has undertaken a number of activities over the past five years to implement this strategic action. For example, relevant information is routinely posted on the town web site; pertinent articles have been written for the town newsletter and FEMA STEP training has been provided for all 5th grade students.
Potential Funding Source: General funds, DEMHS funds
Timeframe: 2014-2019: Periodic informational updates; annual STEP training

Map 12: Avon Population Density, Dams and Flood Zones



Map 13: Avon Flood Plains, Repetitive Loss Areas, Dams and Important Facilities



Bloomfield

The Town of Bloomfield encompasses 26.4 square miles with an average elevation of about 150 feet. The 2010 Census reported Bloomfield's population at 20,486 Bloomfield is primarily within the Park River Watershed. Portions of the Town at the northwest and eastern edges also drain to the Farmington River and directly to the Connecticut River via local brooks. Main watercourses within the Town include Wash, Tumbledown, Beaman, Griffin, and Mill Brooks. Four major flood control reservoirs owned by CT DEEP, and jointly maintained by DEEP and the Town, are located in Bloomfield within the Park River watershed. Large portions of a MDC reservoir and Penwood and Talcott Mountain State Parks are also located in the Town. Major transportation routes through Town include east-west state Routes 218 and 178, as well as north-south running routes 185, 187 and 189. Industries include insurance, aerospace products, specialized tools, electronics, gold and diamond products, diversified industries and agriculture.

Challenges

Flooding is a major concern for the Town of Bloomfield. The Connecticut Department of Environment and Energy owns and manages most of large flood control structures within Bloomfield's borders. The Town does provide limited maintenance to flood control structure. Small areas of the community are frequently subject to flooding, including along Tunxis Avenue and the Town Center, especially around the library. Ensuring proper maintenance of streambeds, to prevent flooding, is also a challenge, as many run across private property.

The National Flood Insurance Program has paid 41 property damage claims in Bloomfield totaling $297,353 to-date. The NFIP has paid out has nine Repetitive Loss Property claims on three properties in Bloomfield to-date. These claims have totaled over $70,000. The Town has taken steps to reduce its vulnerability to flooding. Since 2008, there have been three demolitions of structures located totally or partially in the floodplains. The Old Masonic Hall at 3 Tunxis Avenue, a residential outbuilding at 60 Tunxis Avenue and the warming shed on Filley Park. The Town also adopted new zoning regulations which included a major overhaul and updating of the Floodplain section in 2009. This update of the Floodplain section was in response to directives from FEMA to strengthen the regulations to continue our participation in the Flood Insurance Program.

A significant flood event could result in much damage. CRCOG used FEMA's Hazus-MH model to analyze the risks that the Town of Bloomfield might face from a major flood. The model estimates that economic losses to the town including residential and commercial damage and business interruptions due to a flood having a 1% chance of occurring any given year (the 100-year flood) would be nearly $22 million. The impacts of such a flood are summarized below:

Estimated Damages from 100-Year Flood	Households Displaced	197
	People Needing Shelter	373
	Buildings at Least Moderately Damaged	30
	Total Estimated Economic Losses	$21,720,000
	Total Residential Building & Content Losses	$6,440,000
	Total Commercial, Industrial & Other Building & Content Losses	$15,160,000
	Total Business Interruption Losses	$120,000

CRCOG also used FEMA's Hazus-MH model to analyze the risks that the Town of Bloomfield might face from a hurricane as powerful as the 1938 hurricane. The model estimates that economic losses to the town including residential and commercial damage and business interruptions due to such a Category 3 hurricane would be over $86 million. The impacts of such a storm are summarized below:

Estimated Damages from a 1938 Strength Hurricane	Households Displaced	33
	People Needing Shelter	8
	Buildings at Least Moderately Damaged	742
	Buildings Completely Damaged	36
	Total Estimated Economic Losses	$86,400,000
	Total Residential Building Losses	$55,650,000
	Total Commercial, Industrial & Other Building Losses	$20,250,000
	Total Business Interruption Losses	$10,500,000
	Total Debris Generated	35,692 tons
	Truckloads (at 25 tons/truck) of building debris	349

According to information from the Connecticut Department of Emergency Management and Homeland Security, the three federally declared natural disasters of 2011 resulted in total expenses to the municipality of over $3 million. These expenses include debris and snow removal, emergency protective measures and repairs to damaged infrastructure and buildings but do not include damages experienced by private citizens and businesses.

2011 Disasters Damage Amounts Eligible for 75% Reimbursement Under FEMA Public Assistance Program				
Applicant Town & Other (Fire Districts, Schools, Private Non-Profit Agencies)	**100% of Amount Eligible for 75% Reimbursement**			**Total Damages Eligible for Public Assistance Due to 2011 Disasters**
	DR-1958-CT 2011 Snow	**DR-4023-CT Irene August 2011**	**DR-4046-CT Severe Weather Oct 2011 Alfred)**	
Town of Bloomfield	$88,130.28	$8,275.76	$2,882,712.48	$2,979,118.52
Bloomfield Other			$26,720.34	$26,720.34
Bloomfield Total	**$88,130.28**	**$8,275.76**	**$2,909,432.82**	**$3,005,838.86**

The chart above indicates the amount of Federal (FEMA) claims that the Town of Bloomfield made in 2011. It does not reflect the total amount of economic losses suffered by the community during those events. Debris management and snow storage are issues facing the Town following major storm events.

Another challenge to the Town is maintaining vehicle access through the town during and after disasters. Route 185 is a major east-west route over the ridge in western Bloomfield and the Farmington River in neighboring Simsbury. When Route 185 is closed due to debris or ice and snow, significant traffic volumes must be re-routed in Bloomfield.

Goals, Objectives and Strategies

GOAL: REDUCE LOSS OF LIFE, PROPERTY AND ECONOMIC CONSEQUENCES AS A RESULT OF FLOODING

Objective 1:
Reduce the likelihood of flooding by improving natural and man-made drainage systems.

Strategic Actions:

1.1 Install storm water drainage on those Town roads where it currently does not exist; and improve/replace inadequate storm water systems that currently do exist.
Lead: Engineering/Public Works
Priority: Very High
Status: Engineering is currently identifying those areas which need either storm water sewer system installation or replacement.
Potential Funding Sources: Capital budget
Timeframe: FY 2013-2014 and in future years as needed (2014-2019).

1.2 Encourage property owners to maintain and clear debris from stream channels.
Lead: Public Works, Administration
Priority: Medium
Status: Deferred except as related to specific wetlands violations. It is recommended to continue this effort in the plan update. May consider a review of town ordinances. Could include website updates. Specific means of outreach to be defined and addressed within 2014-2019 plan period.
Potential Funding Sources: Operations & maintenance budget
Timeframe: 2014-2019

Objective 2:
Where feasible, improve and/or modify existing structures that experience flooding to protect from flood damage.

Previous plan strategy:

2.1 Acquire and demolish house on Tunxis Ave. that regularly experiences flooding.
Lead: Administration
Priority: Medium
Status: Property owner demolished one outbuilding on property subject to flooding. Primary residence remains. *(This strategic action will be replaced by 2.1 below.)*

Strategic Actions:

2.1 Improve awareness and encourage flood-proofing for threatened structures.
Lead: Engineering/Building

Priority: Medium
Status: Efforts have been initiated including posting information regarding flooding issues and the NFIP on the Town website.
Potential Funding Sources: Grant funding and Capitol Budget
Timeframe: By 2018.

2.2 Further study and pursue protection measures for Town Library.
Lead: Engineering & Public Works
Priority: Medium
Status: Preliminary study completed. Two options: relocate to town hall site or add space to facility at higher elevation. Options are still under consideration and further study will be undertaken. Procedures have been put in place for moving books prior to expected flooding.
Potential Funding Sources: Bonding supplemented by potential grants.
Timeframe: 2014-2019.

GOAL: REDUCE LOSS OF LIFE, PROPERTY AND ECONOMIC CONSEQUENCES AS A RESULT OF SEVERE WEATHER

Objective 1:
Minimize potential debris from severe storms.

Strategic Actions:

1.1 Conduct a tree and vegetation inventory and develop a maintenance program.
Lead: Public Works
Priority: Medium
Status: Deferred; It is recommended to continue this effort.
Potential Funding Sources: Grants, Capital or O&M budgets
Timeframe: 2014-2019

Objective 2:
Improve ability of public works to prepare and respond to severe weather.

Previous plan strategy:

2.1 Ensure public works has adequate equipment to respond to downed electric wires.
Lead: Public Works, Administration
Priority: Medium
Status: Deferred, downed electric wires need to be handled by CL&P authorized personnel. *(This strategic action will be replaced by 2.1 below.)*

Strategic Actions:

2.1 Ensure public works has adequate facilities and necessary equipment to be responsive to various storm types.

Lead: Public Works, Administration

Priority: High

Status: Improve facilities and acquire equipment necessary to plan for, respond to, and manage storms and consequence management operations. Need to analyze and improve existing operations facility, improve communications, acquire generators, chippers, bucket trucks, slow speed grinders, saws, upgrade electric system at various facilities, provide quartering and other life support capabilities at public works facility in order to sustain extended storm clean up and debris management efforts.

Potential Funding Sources: Capital budget, O& M budget

Timeframe: Annually during the budget review process (2014-2019).

Objective 3:

Implement a resource sharing program with other public works departments.

Strategic Actions:

3.1 Continue to explore service sharing arrangements and engage in CRCOG's service sharing initiative.

Lead: Public Works

Priority: Medium

Status: Resources are routinely shared with other communities during incidents and will continue. State mutual aid agreement has been formalized but needs further development to deal with risk and payment of public works staff.

Potential Funding Sources: Grants through region.

Timeframe: 2014 – 2019

Objective 4:

Improve coordination among, and ability of, all town staff to respond appropriately to severe weather.

Strategic Actions:

4.1 Ensure that all town officials are familiar with emergency preparedness plans.

Lead: Emergency Management

Priority: Medium

Status: Department heads have done debriefing after events and periodic reviews of emergency preparedness plans

Potential Funding Sources: O&M general budget; grants could be sought for specific exercises.

Timeframe: 2014-2019: Annual review of plan

4.2 Improve/replace existing Town communication system in favor of one that is more reliable and has better coverage during storm events.

Lead: Emergency Management/Public Works/Fire

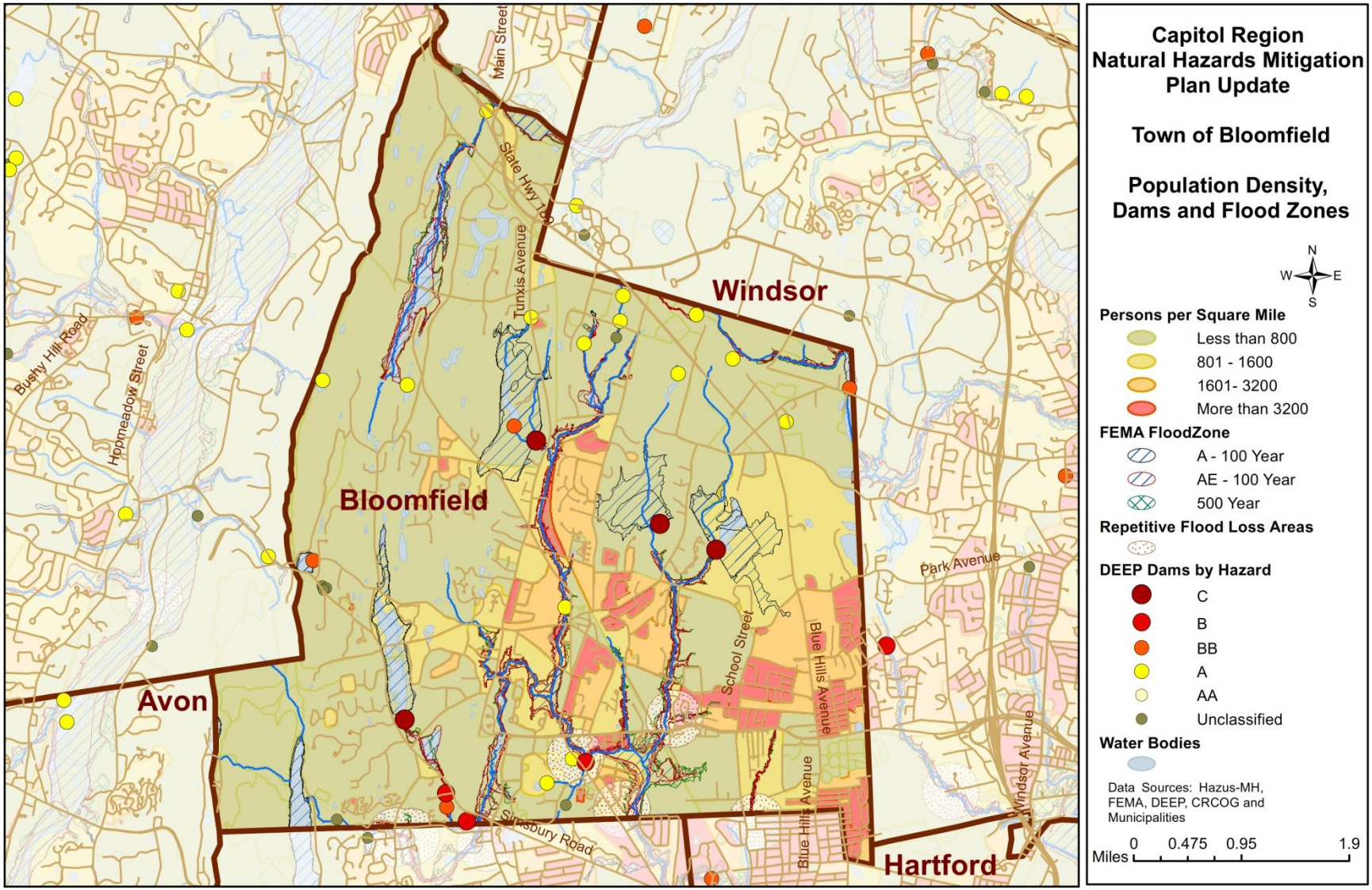
Priority: Medium

Status: This is a newly identified initiative for the plan update; however, a steering committee is currently meeting to plan the replacement and develop equipment costs.

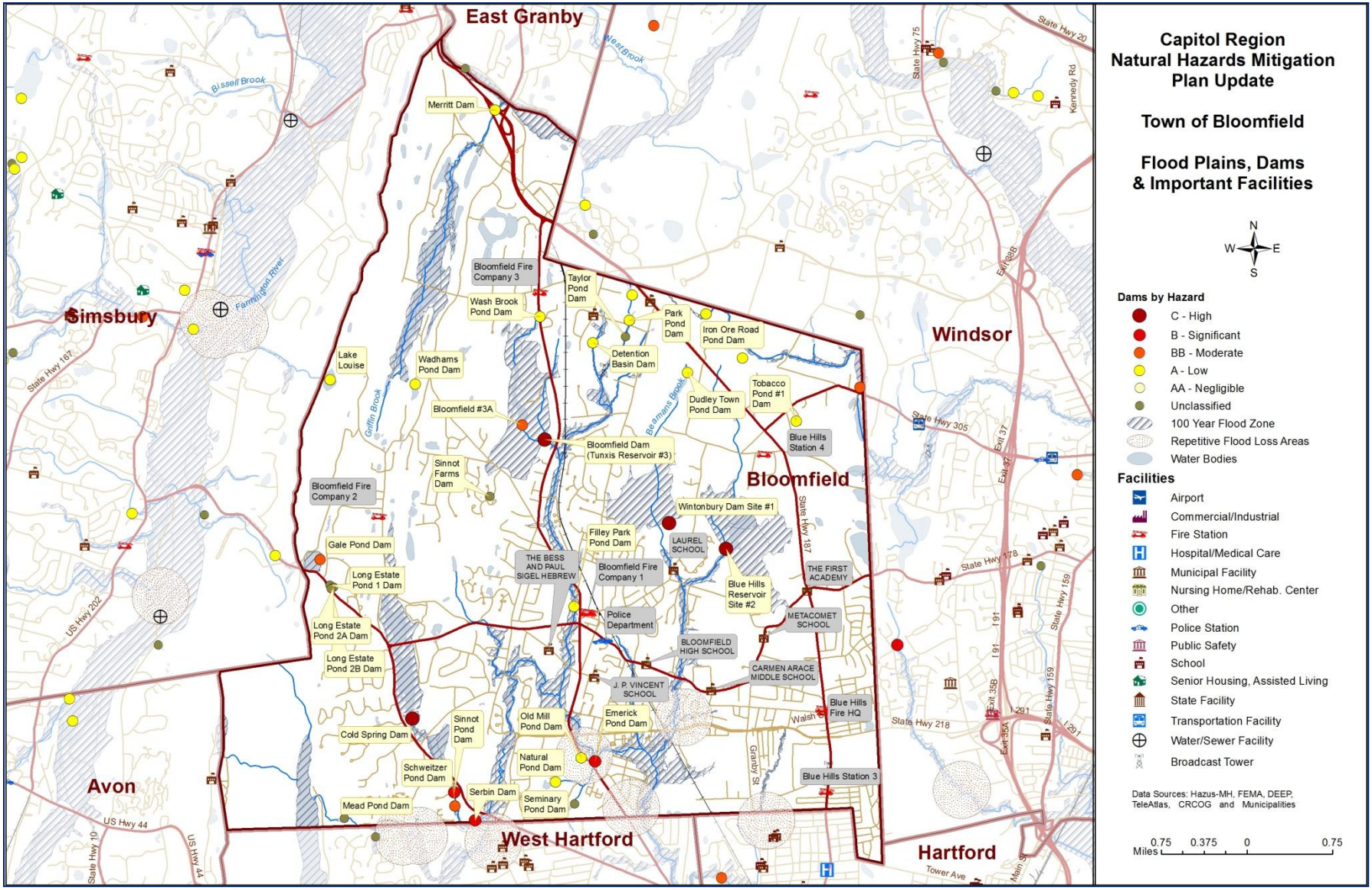
Potential Funding Sources: Grants, Capital Budget.

Timeframe: FY 2013-2014

Map 14: Bloomfield Population Density, Dams and Flood Zones



Map 15: Bloomfield Flood Plains, Repetitive Loss Areas, Dams and Important Facilities



Bolton

Bolton is a rural community in Tolland County with a population of about 5,000. The town is approximately 14.4 square miles and has an elevation of about 700 feet above sea level. Bolton's elevation makes it the high point of the three watersheds it is divided among: the Hockanum, Willimantic, and Salmon. Principal watercourses in Bolton include Railroad Brook, Hop River, Porter Brook, Blackledge River and Baker Brook. The main industries in Bolton include agriculture, manufacturing of printed circuits, commercial cleaning solvents, candy manufacturing, and small machine shop. Major transportation routes through Bolton include the terminus of Interstate 384 and state routes 44, 6 and 85.

Challenges

The Town has a couple of specific areas of concern with respect to flooding, as a result of an under-sized or older culvert. Flooding is typically localized, generally affecting roads rather than facilities and buildings. Financing the studies, planning and actual implementation of new culverts is a major concern. Beaver dams at Notch Pond are also a concern for localized flooding. Bolton has not had any changes in permitting or regulations that would increase its vulnerability to natural hazards since the adoption of the 2008 Plan.

The National Flood Insurance Program has paid two property damage claims in Bolton totaling $3,989.54 to-date. Bolton has no Repetitive Loss Property claims to-date. Although flooding is not as large a concern in Bolton as in some other communities, a significant flood event could result in much damage particularly to residential properties. CRCOG used FEMA's Hazus-MH model to analyze the risks that the Town of Bolton might face from flooding. The model estimates that economic losses to the town including residential and commercial damage and business interruptions due to a flood having a 1% chance of occurring any given year (the 100-year flood) would be nearly $2 million. The impacts of such a flood are summarized below:

Estimated Damages from a 1% (100-Year) Flood	Households Displaced	34
	People Needing Shelter	14
	Buildings at Least Moderately Damaged	0.00
	Total Estimated Economic Losses	$1,970,000
	Total Residential Building & Content Losses	$1,540,000
	Total Commercial, Industrial & Other Building & Content Losses	$440,000
	Total Business Interruption Losses	$0.00

CRCOG also used FEMA's Hazus-MH model to analyze the risks that the Town of Bolton might face from a hurricane as powerful as the 1938 hurricane. The model estimates that economic losses to the town including residential and commercial damage and business interruptions due to such a Category 3 hurricane would be significant and could be over $25 million. The impacts of such a storm are summarized below:

Estimated Damages from	Buildings at Least Moderately Damaged	227
	Buildings Completely Damaged	15
	Total Estimated Economic Losses	$25,315,000

a 1938 Strength Hurricane	Total Residential Building Losses	$19,985,000
	Total Commercial, Industrial & Other Building Losses	$2,759,000
	Total Business Interruption Losses	$2,571,000
	Total Debris Generated	25,149 tons
	Truckloads (at 25 tons/truck) of building debris	88

According to information from the Connecticut Department of Emergency Management and Homeland Security, the three federally declared natural disasters of 2011 resulted in total expenses to the municipality and other public and private nonprofit agencies of over $175,000. These expenses include debris and snow removal, emergency protective measures and repairs to damaged infrastructure and buildings but do not include damages experienced by private citizens and businesses.

2011 Disasters Damage Amounts Eligible for 75% Reimbursement Under FEMA Public Assistance Program				
Applicant: Municipality	**100% of Amount Eligible for 75% Reimbursement**			**Total Damages Eligible for Public Assistance Due to 2011 Disasters**
	DR-1958-CT 2011 Snow	**DR-4023-CT Irene August 2011**	**DR-4046-CT Severe Weather Oct 2011 (Alfred)**	
Town of Bolton	**$27,738.45**	**$20,197.39**	**$127,070.54**	**$175,006.38**

In addition, some areas of Bolton are served by older electrical infrastructure and are especially vulnerable to power outages. As a result, many residents own their own generators; however, the safe operation of generators in houses is a concern to public safety officials. During power outages generators are needed for the operation of grinder pumps serving some residences.

Goals, Objectives and Strategies

The Town of Bolton reviewed the Goals, Objectives and Strategies proposed in the 2008 Plan and determined that the previous goal, its associated objectives and the established mitigation actions should remain. In addition, the Town proposed to initiate several additional strategic actions for the upcoming five years. Several mitigation actions proposed in the 2008 Plan have been completed. These are:

1.1 Study School Road culvert associated with Baker Brook and recommend improvements.
Lead: Public Works
Priority: Medium
Status: Completed

1.2 Implement improvements recommended in above study.
Lead: Public Works, Administration
Priority: Medium
Status: Completed

2.4 Pursue opportunities to increase sheltering capacity.
Lead: Emergency Management
Priority: Medium
Status: Completed

The following is the Town of Bolton's Mitigation Strategy for the 2014-2019 Plan Update:

GOAL: REDUCE THE LOSS OF LIFE AND PROPERTY, AND ECONOMIC CONSEQUENCES OF NATURAL HAZARDS

Objective 1:
Ensure safe access throughout town during storm events and floods.

Strategic Actions:

1.1 Study Lyman Road culvert associated with Blackledge River and recommend improvements.
Lead: Public Works
Priority: Medium
Status: Initial efforts are underway, however study is not complete.
Potential Funding Sources: Town Operating Budget/Grants
Timeframe: 2015-2019.

1.2 Implement improvements recommended in above study.
Because this is expected to be a long term, multi-year project, for the 2014-2019 Plan period, the action to be taken is to develop a scope of work for implementing the recommended improvements.
Lead: Public Works, Administration
Priority: Medium
Status: Deferred: Study needs to be completed first.
Potential Funding Sources: Town Operating Budget/Grants
Timeframe: 2018-2019

1.3 Continue informal arrangements with private contractors for emergency tree/debris removal.
Lead: Public Works
Priority: High
Status: This is an established practice.
Potential Funding Sources: Town Operating Budget
Timeframe: Annually throughout the 2014-2019 plan period

1.4 Monitor and maintain drainage and flood control systems.
Lead: Public Works, Administration
Priority: High
Status: This is an established practice.
Potential Funding Sources: Operating Budget
Timeframe: Annually throughout the 2014-2019 plan period

1.5 Study Johnson Road culvert/dam and recommend improvements.
Lead: Public Works
Priority: Medium
Status: This is a new initiative
Potential Funding Sources: Town Operating Budget/Grants
Timeframe: 2015-2019

1.6 Implement improvements recommended in above study.
Because this is expected to be a long term, multi-year project, for the 2014-2019 Plan period, the action to be taken is to develop a scope of work for implementing the recommended improvements.
Lead: Public Works, Administration
Priority: Medium
Status: This is a new initiative
Potential Funding Sources: Town Operating Budget/Grants
Timeframe: 2018-2019

1.7 Monitor and manage Notch Pond Dam beaver population.
Lead: DEEP with Public Works
Priority: High
Status: This is a new initiative
Potential Funding Sources: Town Operating Budget
Timeframe: 2014 – 2019

Objective 2:
Reduce power outages resulting from natural hazards and their consequences.

Strategic Actions:

2.1 Pursue opportunities to update and/or underground transmission lines.
Lead: Public Works, Planning, Administration
Priority: Low
Status: This is an established practice. Efforts will continue dependent on funding
Potential Funding Sources: Town Operating Budget/Grants
Timeframe: 2014 – 2019

2.2 Maintain good communications with utility companies.
Lead: Public Works, Public Safety, EMD
Priority: Medium
Status: This is an established practice.
Potential Funding Sources: Town Operating Budget
Timeframe: Annually throughout the 2014-2019 plan period

2.3 Conduct public outreach on safe operation of generators.
Lead: Emergency Management, Building Official
Priority: Medium
Status: This is an established practice.
Potential Funding Sources: Town Operating Budget
Timeframe: Annually throughout the 2014-2019 plan period

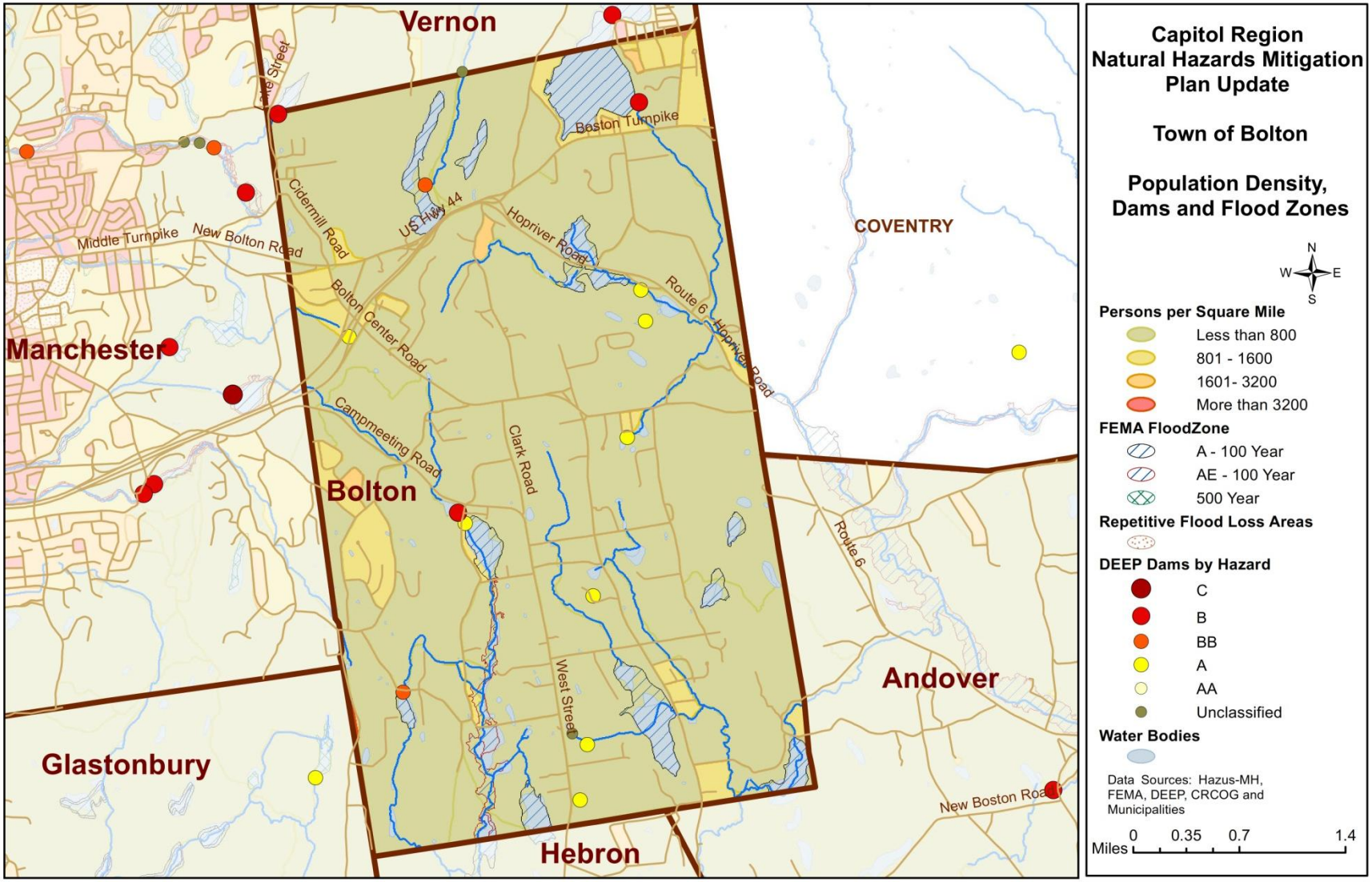
Objective 3:
Ensure emergency services are prepared to respond to natural hazard events.

Strategic Actions:

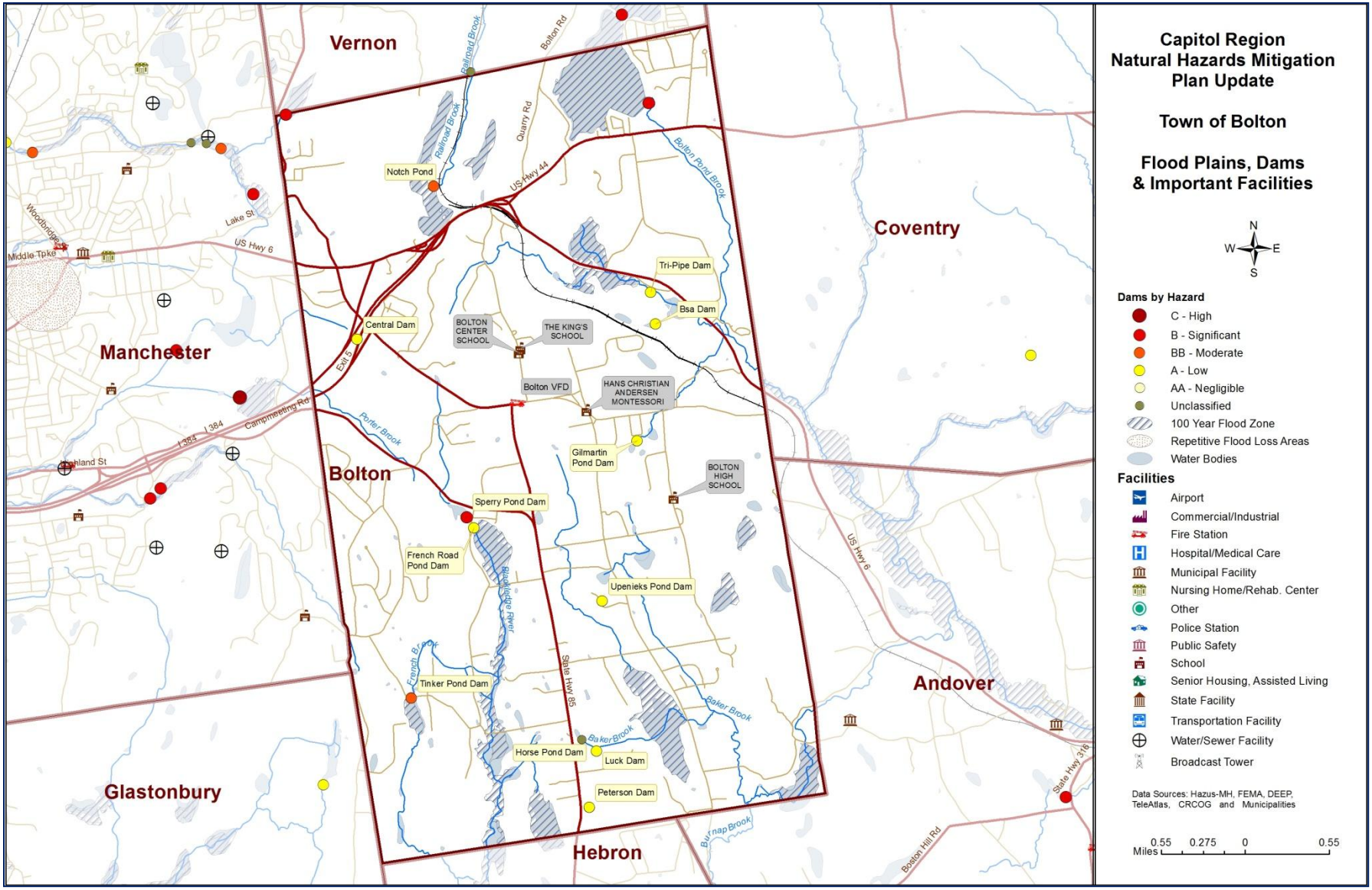
3.1 Implement new town-wide communications system.
Lead: Emergency Management, Administration
Priority: High
Status: In Progress
Potential Funding Sources: Town Operating Budget
Timeframe: Project is expected to be completed in 2014

3.2 Develop and implement plan to power residential grinder pumps during prolonged power outages.
Lead: Emergency Management, Administration with the Bolton Lakes Regional Water Pollution Control Authority (BLRWPCA)
Priority: High
Status: This is a new initiative
Potential Funding Sources: Grants
Timeframe: 2014-2015

Map 16: Bolton Population Density, Dams and Flood Zones



Map 17: Bolton Flood Plains, Repetitive Loss Areas, Dams and Important Facilities



Canton

Canton is a rural town in Hartford County with a population of about 10,000. The Town encompasses 25 square miles and has an elevation ranging from 250 feet in Collinsville to 1100 feet in North Canton. Canton lies within the boundaries of the Farmington River Watershed. The principal watercourses in Town include the Farmington River and the Cherry, Barbour, and Jim Brooks. The major transportation routes that run through Canton include state routes 44, 202 and 179. Major industries located in Canton include plastic injection molding, small businesses and large commercial retail, restaurants, small farming, art galleries, and antique shops.

Challenges

The Town faces flooding challenges, especially at the sewage plant and town garage along the Farmington River, as well as at Dowd's Corner where the East Branch of Rattlesnake Brook meets Rattlesnake Brook. The town garage is located about four feet under Base Flood Elevation. Private properties, including at least one commercial property, at Dowd's Corner have experienced repetitive flood losses. There has been over $70,000 in claims paid out for repetitive losses on six properties insured under the National Flood Insurance Program. Overall, the National Flood Insurance Program (NFIP) has paid 25 claims in Canton totaling nearly $123,000 to-date. Since 2008, there has been no new construction in the floodplain; however, recently a residence located in the floodplain was approved to be reconstructed with the foundation at base flood elevation.

CRCOG used FEMA's Hazus-MH model to analyze the risks that the Town of Canton might face from a major flood. The model estimates that economic losses to the town including residential and commercial damage and business interruptions due to a flood having a 1% chance of occurring any given year (the 100-year flood) would be nearly $52 million. The impacts of such a flood are summarized below:

Estimated Damages from 100-Year Flood	Households Displaced	155
	People Needing Shelter	245
	Buildings at Least Moderately Damaged	34
	Total Estimated Economic Losses	$52,170,000
	Total Residential Building & Content Losses	$16,300,000
	Total Commercial, Industrial & Other Building & Content Losses	$35,680,000
	Total Business Interruption Losses	$180,000

Losses from strong hurricanes would also be significant. The model estimates that economic losses to the town including residential and commercial damage and business interruptions due to a Category 3 hurricane such as the 1938 Hurricane would be nearly $20 million. The impacts of such a storm are summarized below:

Estimated Damages from a 1938 Strength Hurricane	Households Displaced	1
	People Needing Shelter	0
	Buildings at Least Moderately Damaged	148
	Buildings Completely Damaged	3
	Total Estimated Economic Losses	$19,900,000
	Total Residential Building Losses	$15,800,000
	Total Commercial, Industrial & Other Building Losses	$2,200,000
	Total Business Interruption Losses	$1,900,000
	Total Debris Generated	23,947 tons
	Truckloads (at 25 tons/truck) of building debris	83

According to information from the Connecticut Department of Emergency Management and Homeland Security, the three federally declared natural disasters of 2011 resulted in total expenses to the municipality and other local agencies of over $486,000. These expenses include debris and snow removal, emergency protective measures and repairs to damaged infrastructure and buildings but do not include damages experienced by private citizens and businesses.

2011 Disasters Damage Amounts Eligible for 75% Reimbursement Under FEMA Public Assistance Program				
Applicant Town and Other Agencies (i.e., Fire Districts, Schools, and Private Non-Profit Agencies)	**100% of Amount Eligible for 75% Reimbursement**			**Total Damages Eligible for Public Assistance Due to 2011 Disasters**
	DR-1958-CT 2011 Snow	**DR-4023-CT Irene August 2011**	**DR-4046-CT Severe Weather Oct 2011 (Alfred)**	
Town of Canton	$37,329.72	$33,659.34	$386,482.66	$457,471.72
Canton Other	$3,630.46		$25,154.85	$28,785.31
Canton Total	**$40,960.18**	**$33,659.34**	**$411,637.51**	**$486,257.03**

In addition, if the dam at the Barkhamsted Reservoir, located outside of Canton, failed, Canton would experience serious flooding along the Farmington River in about 20 minutes. Similarly, a failure in the Nepaug Reservoir Dam also located just outside of Canton, would quickly cause serious flooding in town. Maintaining accessibility throughout Town during storms is another challenge, given the number of rivers and streams, and the steep slopes in many areas. Areas of potential concern include maintaining access in North Canton and maintaining access and power to the Town elderly housing development at 21 Dowd Avenue.

Goals, Objectives and Strategies

GOAL: REDUCE THE LOSS OF LIFE AND PROPERTY, AND ECONOMIC CONSEQUENCES OF NATURAL HAZARDS

Objective 1:
Reduce flooding damages to existing municipal infrastructure.

Strategies:

1.1 Continue to monitor the availability of an appropriate site for relocating the town garage.
Lead: Public Works, Administration
Priority: High
Status: The Town has developed cost estimates to construct a new garage, identified a site, and held a referendum in 2013, which was not approved by residents. The Town applied for FEMA Pre-Disaster Mitigation Program funds in 2010 to assist in relocating the garage but was unsuccessful in securing these grant funds. Efforts to be undertaken 2014-2016, dependent upon availability of funding and approval of residents
Potential Funding Source: Bonding, grants
Timeframe: 2014-2016

1.2 Maintain flood proofing measures protecting the sewage treatment facility.
Lead: WPCA, Public Works
Priority: High
Status: Supervision and control measures have been established as standard operating practices. Flood proofing measures will continue to be maintained on a routine and as needed basis.
Potential Funding Source: General funds
Timeframe: 2014 – 2019

Objective 2:
Reduce flooding damages to private properties.

Strategies:

2.1 Develop a list of private properties for acquisition as they become available at Dowd's Corner.
Lead: Planning, Emergency Management
Priority: Medium
Status: While no formal plan has been implemented, the Town has considered this strategy as a possibility.
Potential Funding Source: General funds
Timeframe: Efforts to be initiated 2014-2016; completion is estimated for 2019.

(Note: The 2008 Plan also included a related mitigation activity to, "Pursue opportunities for purchasing listed properties." Because no formal list has been developed yet, this follow-up activity has not been included in the Plan Update.)

2.2 Continue to review and enforce development regulations to prevent increased flood risks.
Lead: Planning, Engineering, Building
Priority: High

Status: Applications for development are routinely reviewed for their conformance to flood plain, inland wetlands, and erosion and sedimentation control regulations as they are received. Town inspectors ensure the developments are constructed in conformance with approved plans and regulations. The Town has proposed amendments to the zoning regulations to add low impact development (LID) requirements.
Potential Funding Source: General funds
Timeframe: 2014-2019

2.3 Study potential impacts of Nepaug Reservoir Dam failure.
Lead: Emergency Management, Planning, Administration
Priority: Low
Status: Deferred. A meeting with the Metropolitan District Commission is anticipated in 2014 to discuss planning for a potential failure of the dam and its impacts.
Potential Funding Source: General funds
Timeframe: 2014-2016.

2.4 Develop appropriate evacuation plan based on Nepaug Reservoir Dam failure.
Lead: Emergency Management
Priority: Low
Status: Work with MDC to analyze existing plans and update as necessary.
Potential Funding Source: General funds
Timeframe: 2014-2016.

2.5 Develop appropriate evacuation plan based on Barkhamsted Reservoir Dam failure studies.
Lead: Emergency Management
Priority: Low
Status: Work with MDC to analyze existing plans and update as necessary.
Potential Funding Source: General funds
Timeframe: 2014-2016.

2.6 Enhance town warning system: sirens, public address systems, etc.
Lead: Emergency Management, Police, Fire
Priority: Medium
Status: This project, which was identified in the 2008 Plan, has been completed.

Objective 3:
Ensure good traffic management during any type of hazard event.

Strategies:

3.1 Maintain good communications with neighboring communities' public safety officials to coordinate road closures and detours.
Lead: Emergency Management, Police, Fire
Priority: High
Status: This is an established practice.

Potential Funding Source: General funds
Timeframe: 2014-2019

3.2 Educate residents on most common alternative routes in advance of storms through municipal website and other resident communications.
Lead: Police, Emergency Management, Administration
Priority: Medium
Status: Continue to utilize media, such as the Town website and QNotify to relay information to residents. This will be a sustained and routine procedure undertaken in advance of anticipated events.
Potential Funding Source: General funds
Timeframe: 2014-2019

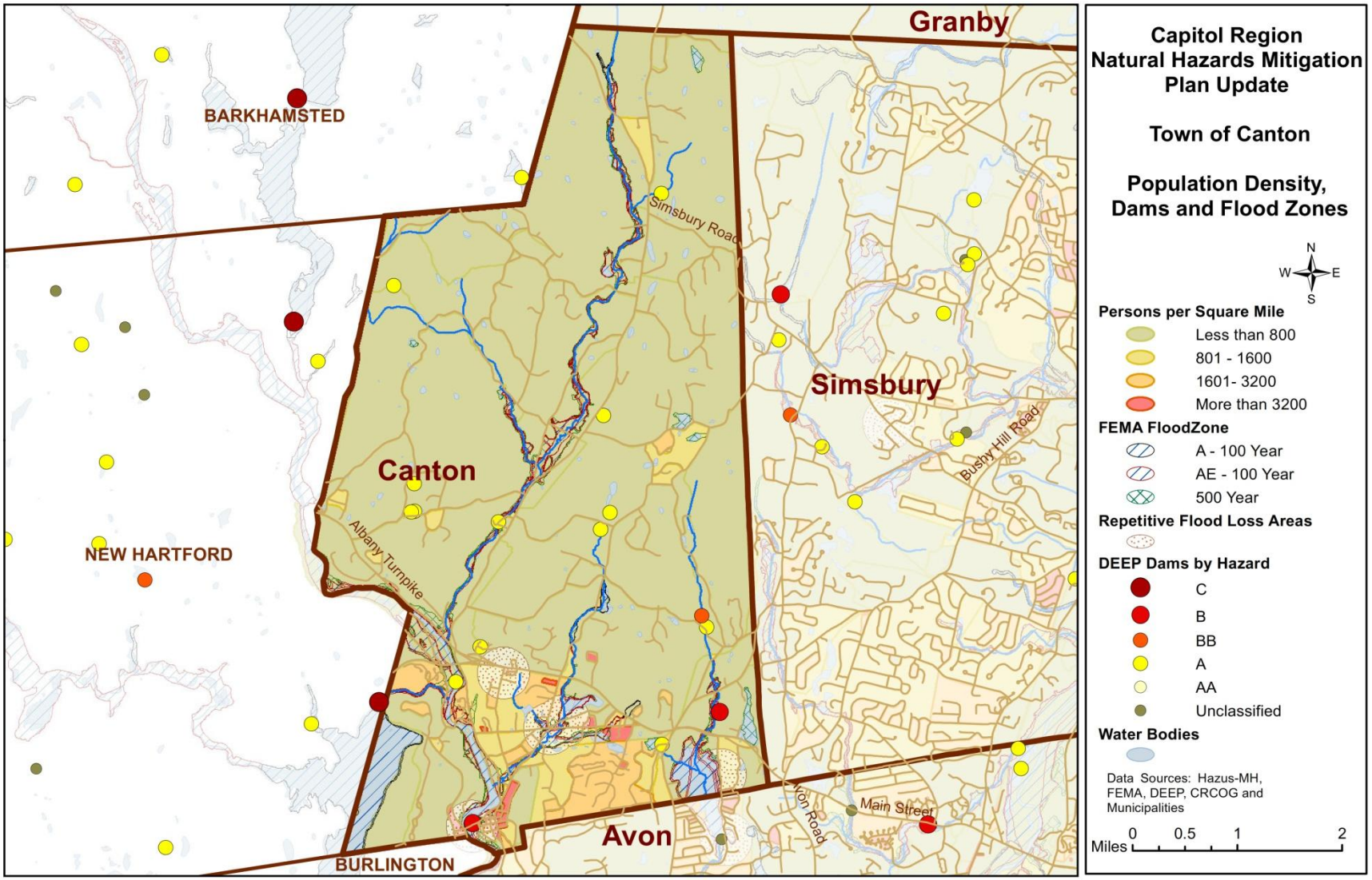
Objective 4:

Minimize power disruptions.

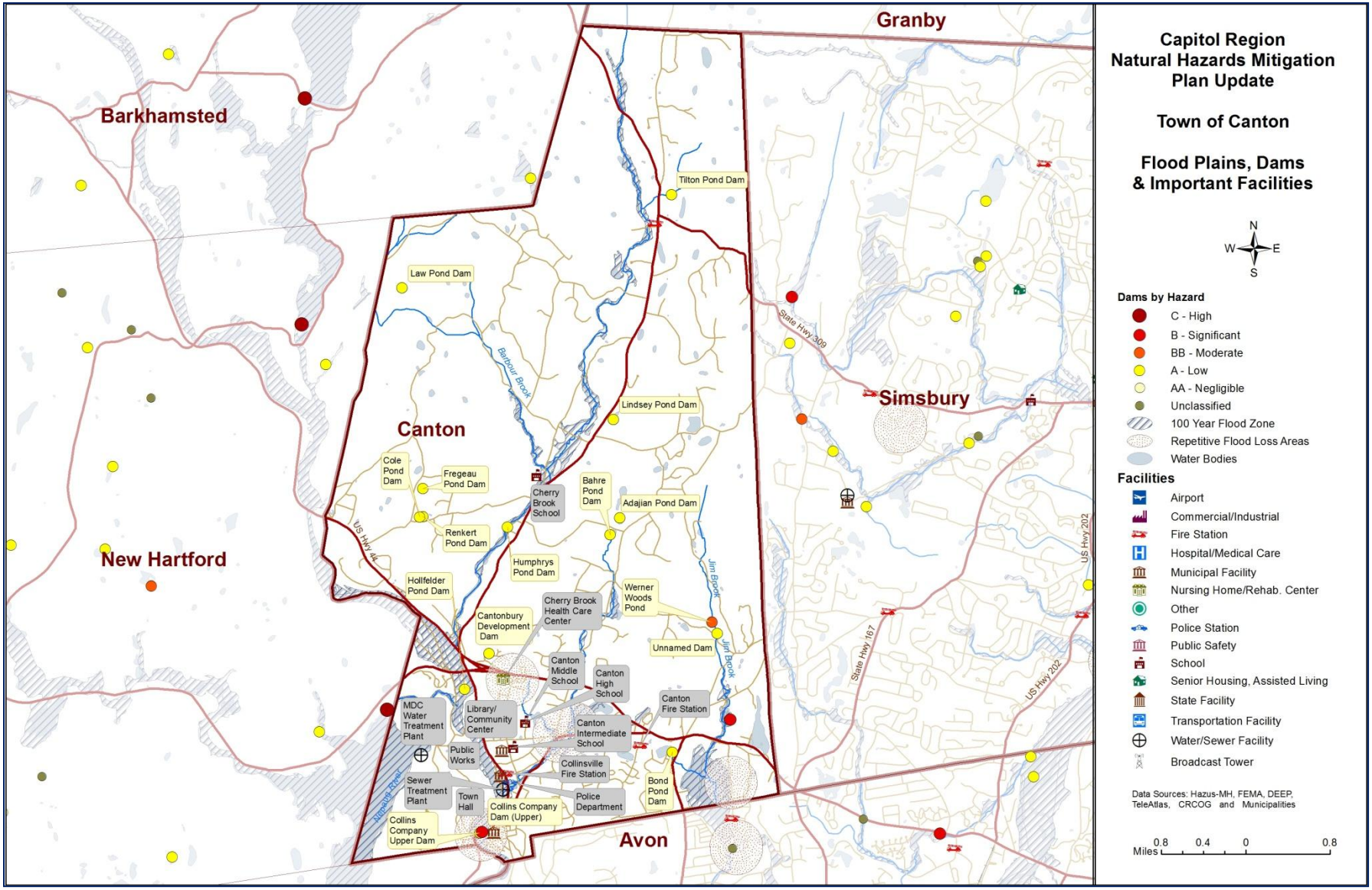
Strategies:

4.1 Maintain good communications with Connecticut Light & Power.
Lead: Emergency Management, Police, Fire
Priority: High
Status: This is an established practice. CL&P has instituted a Town Liaison Program which has helped to ensure good communications between town officials and the utility.
Potential Funding Source: General funds
Timeframe: 2014-2019

Map 18: Canton Population Density, Dams and Flood Zones



Map 19: Canton Flood Plains, Repetitive Loss Areas, Dams and Important Facilities



East Granby

East Granby is a rural community in the Capitol Region that covers encompasses about 17.5 sq. miles and has a population of approximately 5,277. Most of the land area in Town falls in the Farmington River Watershed, though the northeastern portion drains to the Stony Brook watershed. The Farmington River forms the southern municipal boundary. The Salmon and Muddy Brooks are major tributaries to the Farmington that flow through East Granby. Other watercourses running through town include Holcomb, Sanborn and Shelden's Brooks. Farming has traditionally been the mainstay of the Town however today's principle industries include manufacturing and quarrying. The major transportation routes through East Granby are State routes 20, 187 and 189. The Connecticut Air National Guard has a base in East Granby. Bradley International Airport, while primarily located in Windsor Locks to the east, has runway space in East Granby.

Challenges

The National Flood Insurance Program has paid three property damage claims in East Granby totaling $2,317 to-date. East Granby has no Repetitive Loss Property claims to-date. Since the adoption of the 2008 Plan, East Granby has not permitted any new structures or had any demolitions in the floodplain. Although flooding is not as large a concern in East Granby as in some other communities, a significant flood event could result in much damage. CRCOG used FEMA's Hazus-MH model to analyze the risks that the Town of East Granby might face from flooding. The model estimates that economic losses to the town including residential and commercial damage and business interruptions due to a flood having a 1% chance of occurring any given year (the 100-year flood) would be over $13 million. The impacts of such a flood are summarized below:

Estimated Damages from 100-Year Flood	Households Displaced	67
	People Needing Shelter	96
	Buildings at Least Moderately Damaged	13
	Total Estimated Economic Losses	$13,340,000
	Total Residential Building & Content Losses	$7,210,000
	Total Commercial, Industrial & Other Building & Content Losses	$6,110,000
	Total Business Interruption Losses	$10,000

CRCOG also used FEMA's Hazus-MH model to analyze the risks that the Town of East Granby might face from a hurricane as powerful as the 1938 hurricane. The model estimates that economic losses to the town including residential and commercial damage and business interruptions due to such a Category 3 hurricane would be nearly $20 million. The impacts of such a storm are summarized below:

Estimated Damages from a 1938 Strength Hurricane	Households Displaced	1
	People Needing Shelter	0
	Buildings at Least Moderately Damaged	135
	Buildings Completely Damaged	6
	Total Estimated Economic Losses	$19,800,000
	Total Residential Building Losses	$13,580,000

	Total Commercial, Industrial & Other Building Losses	$4,210,000
	Total Business Interruption Losses	$2,040,000
	Total Debris Generated	21,073 tons
	Truckloads (at 25 tons/truck) of building debris	67

According to information from the Connecticut Department of Emergency Management and Homeland Security, the three federally declared natural disasters of 2011 resulted in total expenses to the municipality of $643,437.30. These expenses include debris and snow removal, emergency protective measures and repairs to damaged infrastructure and buildings but do not include damages experienced by private citizens and businesses.

2011 Disasters Damage Amounts Eligible for 75% Reimbursement Under FEMA Public Assistance Program				
Applicant: Municipality	**100% of Amount Eligible for 75% Reimbursement**			**Total Damages Eligible for Public Assistance Due to 2011 Disasters**
	DR-1958-CT 2011 Snow	**DR-4023-CT Irene August 2011**	**DR-4046-CT Severe Weather Oct 2011 (Alfred)**	
East Granby	**$75,416.27**	**$12,698.57**	**$555,322.46**	**$643,437.30**

In the past, the town experienced roof collapses due to heavy snow loads on flat roofed buildings.

Goals, Objectives and Strategies

GOAL: REDUCE THE IMPACTS OF FLOODING ON PEOPLE AND PROPERTY

Objective 1:
Strengthen land use regulations, and their implementation, to ensure flood risks do not increase.

Strategic Actions:

1.1 Consider requiring more low impact development measures through zoning regulations.
Lead: Community Development
Priority: Medium
Status: Adopted performance based LID regulations in 2012. Will continue to evaluate applications to existing development and amendments to the regulations. May look at case studies.
Potential Funding Sources: Used DEEP grant to develop regulations. Will explore additional grant funding options for future efforts.
Timeframe: 2015-2018

1.2 Educate land use officials on low impact development techniques.
Lead: Community Development
Priority: Medium

Status: Prepared education manual to accompany model regulations. Will work with development community on expectations for use of LID as part of development review process and will look into developing demonstration sites. Demonstration site would be dependent on available funding.
Potential Funding Sources: grant funding
Timeframe: 2015-2018

Objective 2:
Encourage acquisition of undeveloped land subject to flooding as open space.

Strategic Actions:

2.1 Develop an open space plan, with special attention paid to land along rivers and streams not only because of flooding concerns, but also for recreation and wildlife management interests.
Lead: Community Development
Priority: Medium
Status: Deferred; however, as part of the LID project, the Town conducted a natural and cultural resources inventory which will set the stage for identifying open spaces. State funds were used to buy development rights for 400+ acres of farmland. The Town will be updating the Plan of Conservation and Development in 2014.
Potential Funding Sources: Limited funds available in town open space fund which is funded through fees in lieu and from the CIP.
Timeframe: 2014-2019: Further initial efforts to be considered as part of POCD update in 2014. Develop priorities for evaluating parcels for preservation: 2017. Complete Plan: 2019.

Objective 3:
Improve stormwater management practices to reduce runoff.

Strategic Actions:

3.1 Continue to implement measures under Phase II MS4 Stormwater program.
Lead: Public Works
Priority: High
Status: Nearly complete with mapping: Used CRCOG 2009 aerials to identity and mark manholes, catch basins, culverts. Will continue work in the plan update period. Potential Funding Sources: Operating budget
Timeframe: Expect completion in 2014.

Objective 4:
Ensure that vulnerable areas remain accessible during floods.

Strategic Actions:

4.1 Develop a plan for accessing flood prone areas, such as Winding Hill Road.
Lead: Public Works, Emergency Management, Community Development and Administration
Priority: Medium
Status: Identified two new routes for emergency access. Construction of Tunxis Avenue access is anticipated for fall 2013. Cowles Park access option is in the planning process currently.
Potential Funding Sources: Operating funds.
Timeframe: 2013-2014 for Tunxis; 2017-2018 for Cowles Park

4.2 Implement recommendations from above-mentioned plan.
Lead: Public Works, Emergency Management, Community Development and Administration
Priority: Low
Status: Underway (see above)
Potential Funding Sources: Cowles Park – operating budget
Timeframe: 2013-2014 for Tunxis; 2017-2018 for Cowles Park

4.3 Address Floydville Road culvert, either by cleaning or by replacing.
Lead: Public Works, Administration
Priority: Low
Status: Completed: replaced in 2011. No additional work needed.

GOAL: MINIMIZE LOSS OF LIFE, PROPERTY AND ECONOMIC CONSEQUENCES OF HIGH WIND AND WINTER STORM EVENTS

Objective 1:
Ensure adequate tree trimming in public rights-of-way.

Strategic Actions:

1.1 Continue tree evaluation practices.
Lead: Public Works
Priority: Medium
Status: The Director of Public Works is also the Town's tree warden and routinely although informally evaluates maintenance; will consider more formal process and identification of areas with overhead wires.

Potential Funding Sources: operating budget
Timeframe: Initiate in 2015. Complete in 2017.

1.2 Continue to contract out preventive maintenance of trees.
Lead: Public Works, Administration
Priority: Medium
Status: Purchased bucket truck in 2010 to do some work with town staff. Will continue to contract for larger jobs. Routine work to be carried out with town staff. Annual review to be conducted during budget process.
Potential Funding Sources: operating budget.
Timeframe: 2014-2019

Objective 2:
Minimize power outages.

Strategic Actions:

2.1 Analyze areas where outages occur and monitor new developments.
Lead: Public Works, Police, Administration
Priority: Medium
Status: Held two workshops with industrial users to identify reliability issues over the last two years. Will hold another workshop on cogeneration for manufacturers.
Potential Funding Sources: operating budget
Timeframe: Expect completion in 2014

2.2 Work with utility to reduce outages in areas frequently without power.
Lead: Public Works, Administration
Priority: Medium
Status: Worked with CL&P on aggressive tree cutbacks and to identify a prioritized list of facilities for power restoration. This effort is completed. (CL&P upgraded transmission line after Storm Alfred.)

Objective 3:
Communicate effectively with residents before, during and after hazard events.

Strategic Actions:

3.1 Continue to maintain special needs population list.
Lead: Administration
Priority: Medium
Status: Updated quarterly and available to public safety personnel.
Potential Funding Sources: operating budget

Timeframe: Will continue to maintain quarterly throughout 2014-2019

3.2 Monitor and ensure effective implementation of Reverse-911 system.
Lead: Administration, Emergency Management
Priority: Medium
Status: Purchased Everbridge Aware module in 2012. Will continue to maintain annual subscription. Will consider tying Everbridge into website for notifications.
Potential Funding Sources: operating budget
Timeframe: 2014-2019: To be included annually as line item in police/public safety budget.

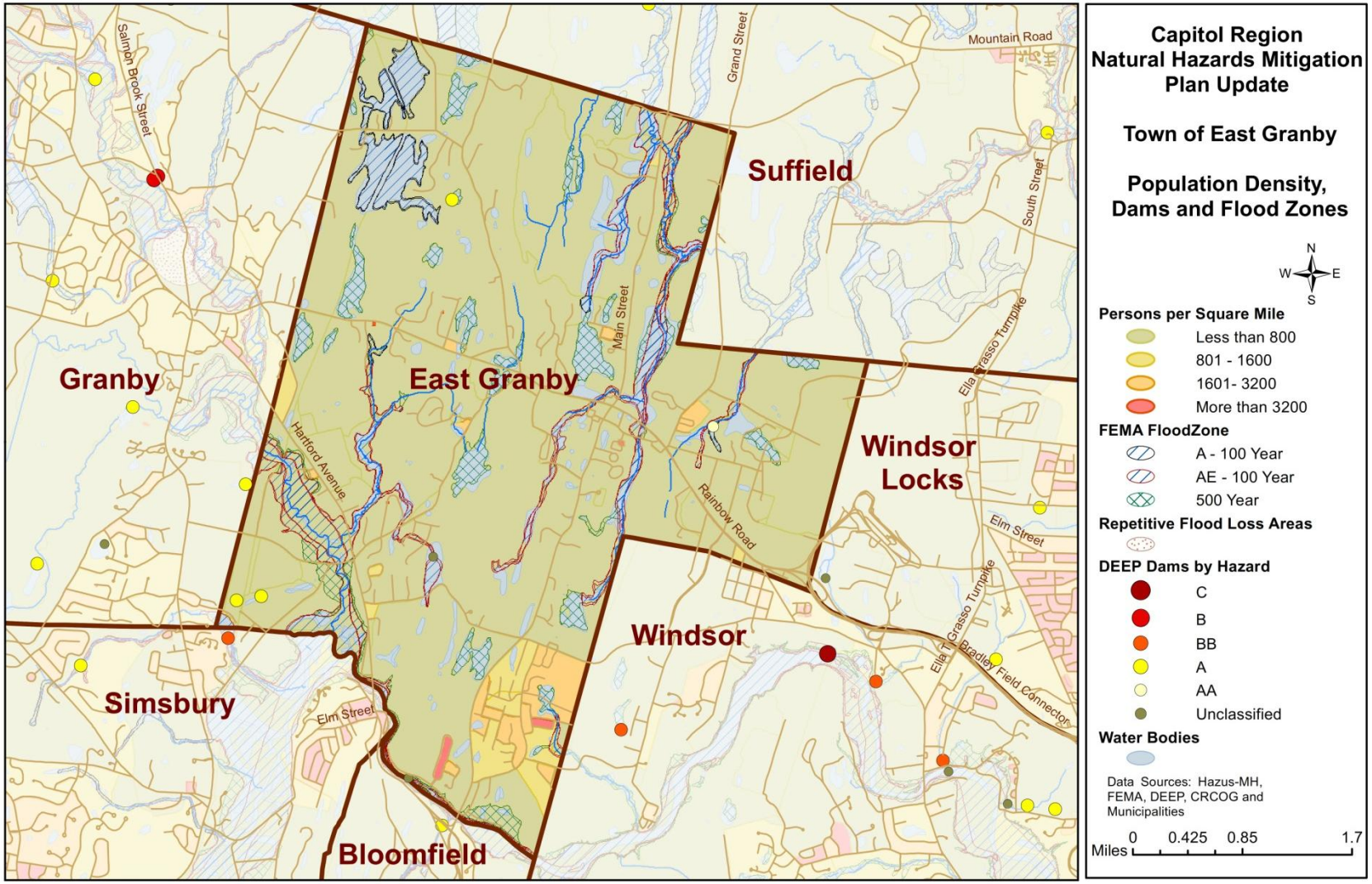
Objective 4:
Ensure that roads in East Granby remain passable.

Strategic Actions:

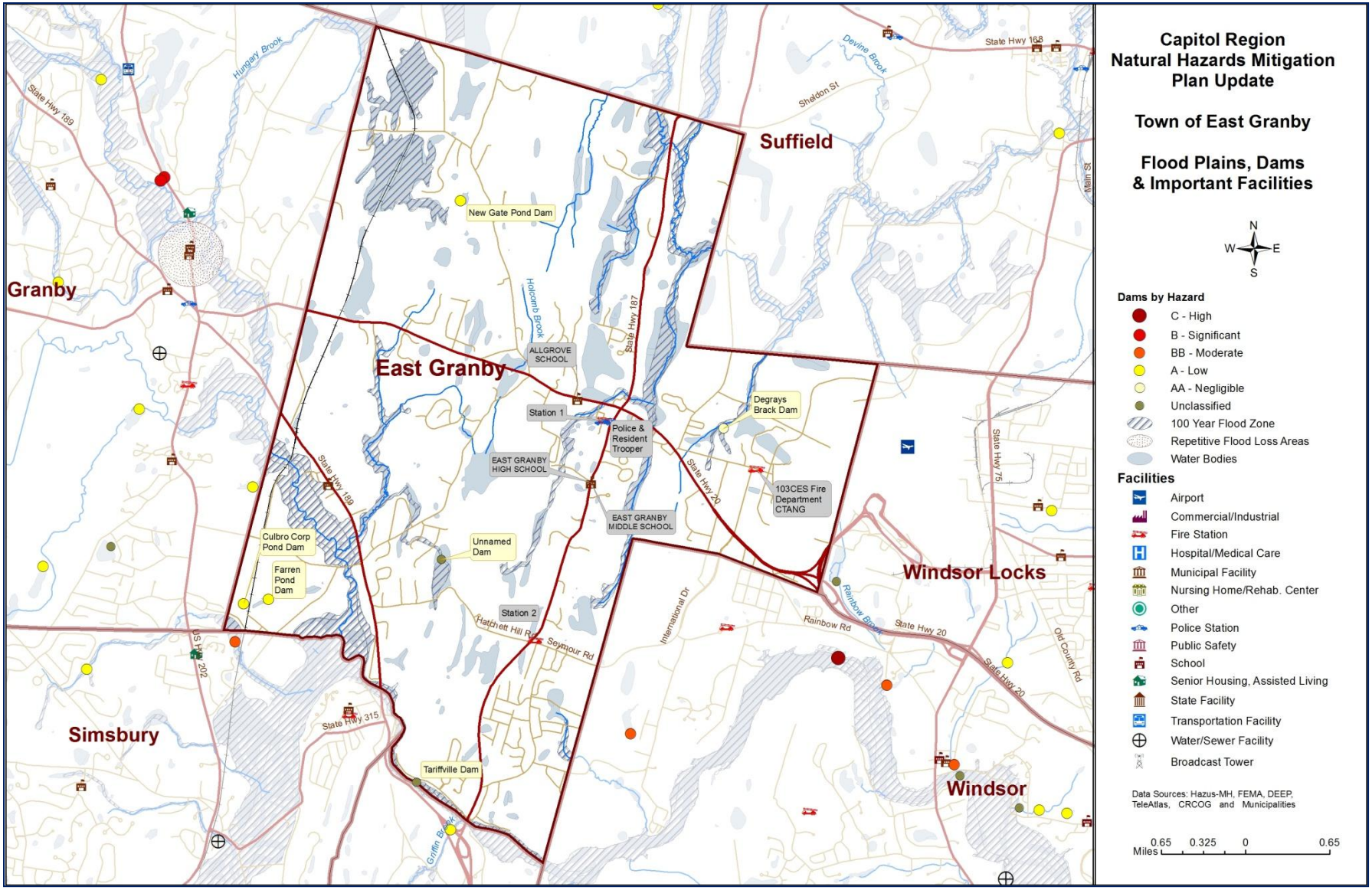
4.1 Treat roads in advance of winter storms, when possible.
Lead: Public Works
Priority: Medium
Status: Advance treatment is routinely carried out. Will continue.
Potential Funding Sources: operating budget
Timeframe: 2014-2019: In advance of storms.

4.2 Continue to address state roads, when necessary to maintain safety.
Lead: Public Works
Priority: Low
Status: Work to clear state road is done as necessary. Will continue to maintain a good working relationship with ConnDOT staff. This is a routine and sustained effort which will continue to be undertaken as necessary.
Potential Funding Sources: operating budget
Timeframe: 2014-2019

Map 20: East Granby Population Density, Dams and Flood Zones



Map 21: East Granby Flood Plains, Repetitive Loss Areas, Dams and Important Facilities



East Hartford

The Town of East Hartford is a suburban community of approximately 52,212 located east of the City of Hartford and west of the Town of Manchester. The Town covers slightly more than 18 square miles. East Hartford's land area drains primarily to the Connecticut and Hockanum Rivers. Four other waterways: Burnham, Willow, Pewterpot, and Porter Brooks, provide critical paths for the drainage of upland areas. Many regionally significant transportation routes traverse and intersect in East Hartford including Interstate 84 and 384, and Routes 2, 5, 15, and 44.

Principal industries include aerospace manufacturing and contractors, warehouse and distribution centers, as well as light industrial and retail businesses. Connecticut Natural Gas and the State Department of Information Technology, among others, maintain critical infrastructure in Town. East Hartford is home to the University of Connecticut Huskies football team, Goodwin College, Coca Cola, and, more recently, Cabela's retail store at Rentschler Field. Continued development of the former Rentschler Airfield promises to bring additional corporate, state, municipal and retail opportunities to the Town.

Challenges

Following historic flooding of the Connecticut River Valley in 1936 and 1938, the Army Corps of Engineers designed and constructed a levee system in East Hartford to protect the Town from future catastrophic flooding. The Town has operated and maintained the levee system since its initial construction and recently has undertaken an multi-year $21 million capital improvement program dedicated to the system. These improvements have allowed the Town to obtain accreditation by FEMA and maintain active status on the U.S. Army Corps of Engineers' list of flood control systems.

The Metropolitan District Commission's (MDC) Clean Water Project presents substantial opportunities and challenges to the Town. As planning for the separation of storm water and sewer lines throughout the Region continues, it is critical for the Town to monitor impacts on flood control infrastructure.

East Hartford participates in the National Flood Insurance Program and carefully evaluates proposed development in hazard prove areas. Since the adoption of the 2008 Plan, a number of floodplain permits have been reviewed and approved subject to the requirements of the adopted floodplain regulations. The Town has made a number of roadway improvements, culvert repairs, and levee repairs. The Town has also permitted renovations, repairs or replacement of a parking lot, stormwater outfall, dock and pier; building additions; replacement of a house; as well as construction of a new magnet school, and demolition of a house and tobacco shed in the flood plain.

To date, the National Flood Insurance Program has paid 96 property damage claims in East Hartford totaling $455,077. East Hartford has had 17 Repetitive Loss Property claims, totaling $228,580, on six properties to-date. A significant flood event could result in considerable damage. CRCOG used FEMA's Hazus-MH model to analyze the risks from flooding that might face the Town of East Hartford. The model estimates that economic losses to the Town, including residential and commercial damage and business interruptions, from a '100 year' flood would be over $33 million. The specific economic impact of such a flood is summarized below:

Estimated Damages from 100-Year Flood	Households Displaced	422
	People Needing Shelter	997
	Buildings at Least Moderately Damaged	41
	Total Estimated Economic Losses	$33,550,000
	Total Residential Building & Content Losses	$14,330,000
	Total Commercial, Industrial & Other Building & Content Losses	$19,030,000
	Total Business Interruption Losses	$18,000

CRCOG also used FEMA's Hazus-MH model to analyze the risks that the Town of East Hartford might face from a hurricane similar to the 1938 hurricane. The model estimates that economic losses to the town, including residential and commercial damage and business interruption, would be over $240 million. The specific economic impact of such a storm is summarized below:

Estimated Damages from a 1938 Strength Hurricane	Households Displaced	271
	People Needing Shelter	73
	Buildings at Least Moderately Damaged	2009
	Buildings Completely Damaged	113
	Total Estimated Economic Losses	$241,100,000
	Total Residential Building Losses	$168,500,000
	Total Commercial, Industrial & Other Building Losses	$42,250,000
	Total Business Interruption Losses	$30,350,000
	Total Debris Generated	49,140 tons
	Truckloads (at 25 tons/truck) of building debris	1100

According to information provided by the Connecticut Department of Emergency Management and Homeland Security, the three federally declared natural disasters of 2011 resulted in total expenses to the municipality over $2.5 million. These expenses include debris and snow removal, emergency protective measures and repairs to damaged infrastructure and buildings. This amount does not include damages experienced by private citizens and businesses.

2011 Disasters Damage Amounts Eligible for 75% Reimbursement Under FEMA Public Assistance Program				
Applicant: Municipality and Other Agencies (i.e., Fire Districts, Schools, and Private Non-Profit Agencies)	**100% of Amount Eligible for 75% Reimbursement**			
	DR-1958-CT 2011 Snow	**DR-4023-CT Irene August 2011**	**DR-4046-CT Severe Weather Oct 2011 (Alfred)**	**Total Damages Eligible for Public Assistance Due to 2011 Disasters**
Town of East Hartford	$273,700.15	$226,257.35	$1,812,341.64	$2,312,299.14
East Hartford Other	$7,194.00	$147,730.66	$94,244.91	$249,169.57
East Hartford Total	**$280,894.15**	**$373,988.01**	**$1,906,586.55**	**$2,561,468.71**

Under the Direction of the Mayor, an effort is underway to expand the Town's GIS capacity and use. This can support Emergency Management needs of this community by providing a more robust GIS that can provide real-time tracking of debris, damaged structures, and infrastructure disruptions.

Goals, Objectives and Strategies

GOAL: REDUCE THE LIKELIHOOD OF LOSSES OF LIFE AND PROPERTY FROM FLOODING

Objective 1:
Ensure proper maintenance of flood control system.

Strategic Actions:

1.1 Continue to implement necessary repairs and upgrades required by FEMA and the Army Corps of Engineers to retain accreditation.
Lead: Public Works, Engineering
Priority: High
Status: The Town has instituted a multi-million dollar multi-year flood control system modification/reconstruction project. The Town's draft update to its Plan of Conservation and Development includes recommendations to monitor the flood protection system and fund additional improvements as necessary to ensure the retention of Army Corps of Engineers certification. Flood control system modifications and reconstruction are included in the Town's Capital Improvements Program.
Potential Funding Source: bonds
Timeframe: 2014-2019

1.2 Continue periodic updates to the flood control system manual as system improvements are completed.
Lead: Public Works, Engineering
Priority: Medium
Status: This is an established practice.
Potential Funding Source: Town general fund
Timeframe: 2014 – 2019

1.3 Train town employees, according to the updated manual, in proper flood fighting operation and maintenance techniques.
Lead: Public Works, Administration
Priority: High
Status: This is an established practice.
Potential Funding Source: Town general fund
Timeframe: 2014 – 2019

Objective 2:
Identify and pursue priority drainage improvement projects in existing natural and artificial drainage systems.

Strategic Actions:

2.1 Evaluate the condition and sustainability of existing drainage systems.
Lead: Public Works, Engineering
Priority: High
Status: The Town has included drainage studies of Willow Brook, Burnham Brook and the town wide storm drainage and outfall repair programs in the Capital Improvements Program. The Town's draft update to its Plan of Conservation and Development includes recommendations to undertake a comprehensive drainage study and recommends revising local regulations to reduce impervious surfaces and encourage green site development techniques.
Potential Funding Source: Town general fund
Timeframe: 2014-2019: The drainage studies are anticipated to be completed in 2014. Storm drainage and outfall repair projects are assessed annually during the budget process.

2.2 Develop a capital improvement plan to improve existing drainage projects.
Lead: Public Works, Administration
Priority: High
Status: The Town has developed an annually updated Capital Improvement Program to address the drainage repair program.
Potential Funding Source: Town general fund
Timeframe: 2014-2019: Drainage projects are included in Town's FY13/14 – 17/18 Capital Improvements Program. The CIP is reevaluated annually during budget process.

2.3 Pursue priority drainage projects identified in capital improvement plan.
Lead: Public Works, Administration
Priority: High
Status: The Capital Improvement Program includes funding to replace the McAuliffe Park culvert, repair the Porter/Main Street culvert, repair the Arbutus Street outfall, and reconstruct drainage on Howard Street and John Street. The program also includes funding to repair numerous storm drains and outfalls throughout the city.
Potential Funding Source: Town general fund
Timeframe: 2014-2019: Drainage projects are included in Town's FY13/14 – 17/18 Capital Improvements Program. The CIP is reevaluated annually during budget process.

Objective 3:
Improve the ability of emergency responders to prepare for and respond to natural disasters.

Strategic Actions:

3.1 Exercise and refine critical components of National Incident Management System with an emphasis on interagency communication and cooperation.

Lead: Fire, Police, Emergency Management
Priority: High
Status: This remains a high priority despite substantial progress in this area. The community has trained a significant number of employees to the appropriate NIMS level.
Potential Funding Source: FEMA funding through CRCOG
Timeframe: 2014-2019: Periodically, as available.

3.2 Participate in local, regional and state-wide natural disaster preparedness training.
Lead: Emergency Management, Fire, Police
Priority: Medium
Status: This remains a medium priority despite substantial progress in this area. The community participates in the regional preparedness and training effort through its participation in the regional emergency planning team (REPT). This goal is also met by maintaining a community presence in statewide efforts such as the Department of Emergency Management and Homeland Security Coordinating Council.
Potential Funding Source: Town general fund, FEMA funding through CRCOG
Timeframe: 2014-2019: Periodically, as available.

Objective 4:
Improve the ability of emergency responders to serve the special needs population during all types of emergencies.

Strategic Actions:

4.1 Develop and maintain an accessible registry of residents with special needs using a regional model.
Lead: Emergency Management, Health
Priority: High
Status: This remains a high priority. The community has not made significant progress in this area. This was identified as a need for improvement after the October 2011 storm. The community will use the newly issued Emergency Support Function 6 Mass Care Annex as a guide and planning tool for improvement of shelter operations.
Potential Funding Source: Town general fund
Timeframe: 2014-2019

4.2 Use a public notification system.
Lead: Emergency Management, Fire, Police
Priority: Medium

Status: This is a high priority for the community. The community has signed an agreement with Everbridge to provide full-service public messaging. This contract was executed in 2012. This system fully implemented now. Use of system will continue throughout the 2014-2019 plan period and upgrades will be made as required.
Potential Funding Sources: Town general fund
Timeframe: 2014-2019

4.3 Continue training for the evacuation, sheltering and protection of special needs populations.
Lead: Emergency Management, Fire, Police
Priority: Medium
Status: This remains a medium priority. The community has not made significant progress in this area. This was identified as a need for improvement after the October 2011 storm. The community will use the newly issued Emergency Support Function 6 Mass Care Annex as a guide and planning tool for improvement of shelter operations.
Potential Funding Sources: Town general fund
Timeframe: 2014-2019

Objective 5:
Improve emergency communications to residents prior to and during natural disasters.

Strategic Actions:

5.1 Identify and acquire public notification system, like Reverse-911, for facilitating communication of critical information to residents of all means.
Lead: Emergency Management, Police, Fire
Priority: Medium
Status: Similar to Objective 4.2, this is a high priority for the community. The community has signed an agreement with Everbridge to provide full-service public messaging. Implementation is complete. Use of and upgrades to system will continue.
Potential Funding Sources: Town general fund
Timeframe: 2014-2019

5.2 Offer educational forums for residents on personal emergency planning.
Lead: Emergency Management, Health
Priority: Medium
Status: This remains a medium priority. The Community Emergency Response Team (CERT) has and will continue to provide personal emergency planning for residents of the community. They will be participating in a pilot delivery of the regional 'Get Ready' program in an effort to improve our capability.
Potential Funding Source: Town general fund, FEMA funding through CRCOG
Timeframe: 2014-2019

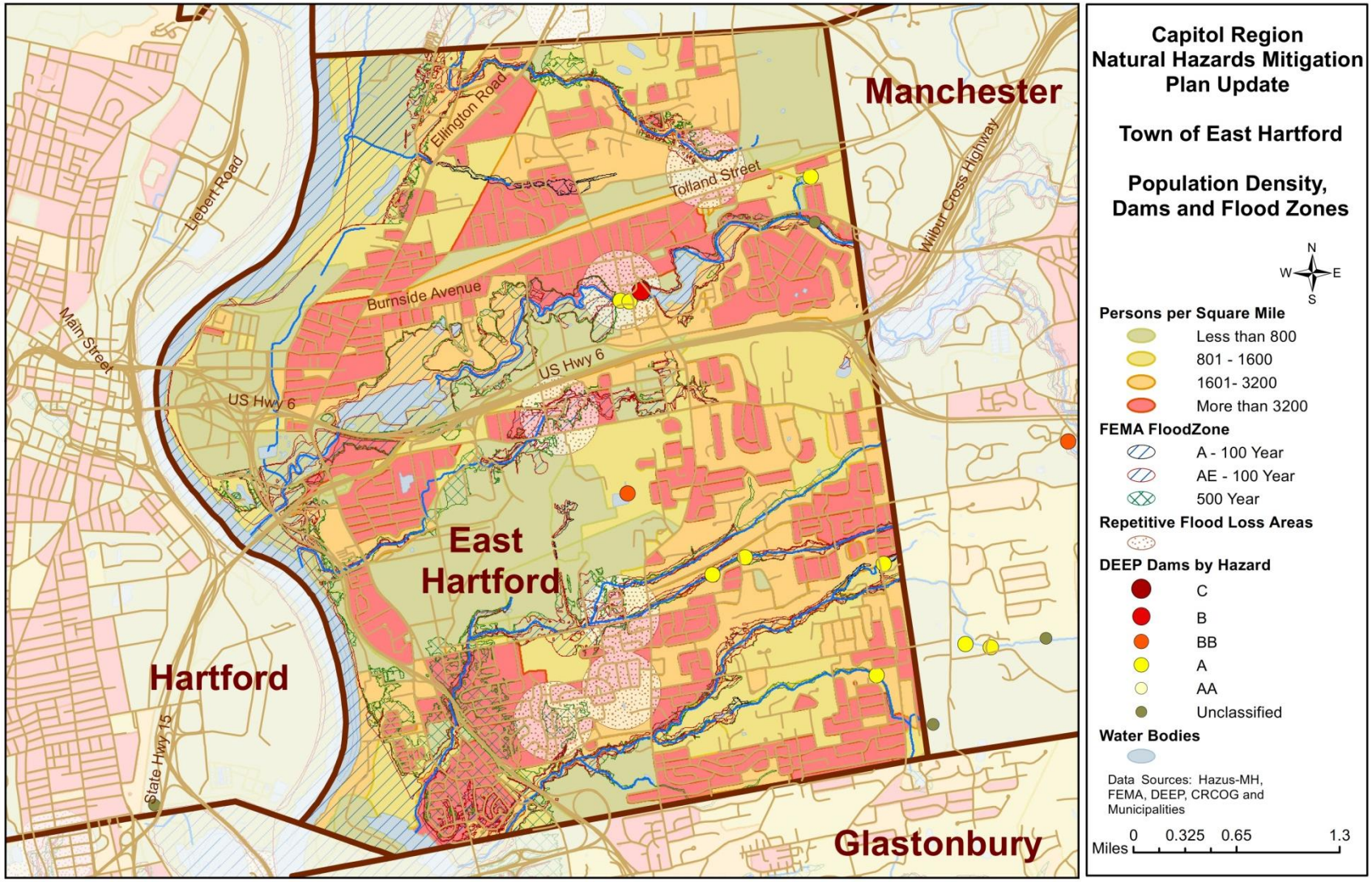
Objective 6:
Improve awareness of flooding risks among property owners.

Strategic Actions:

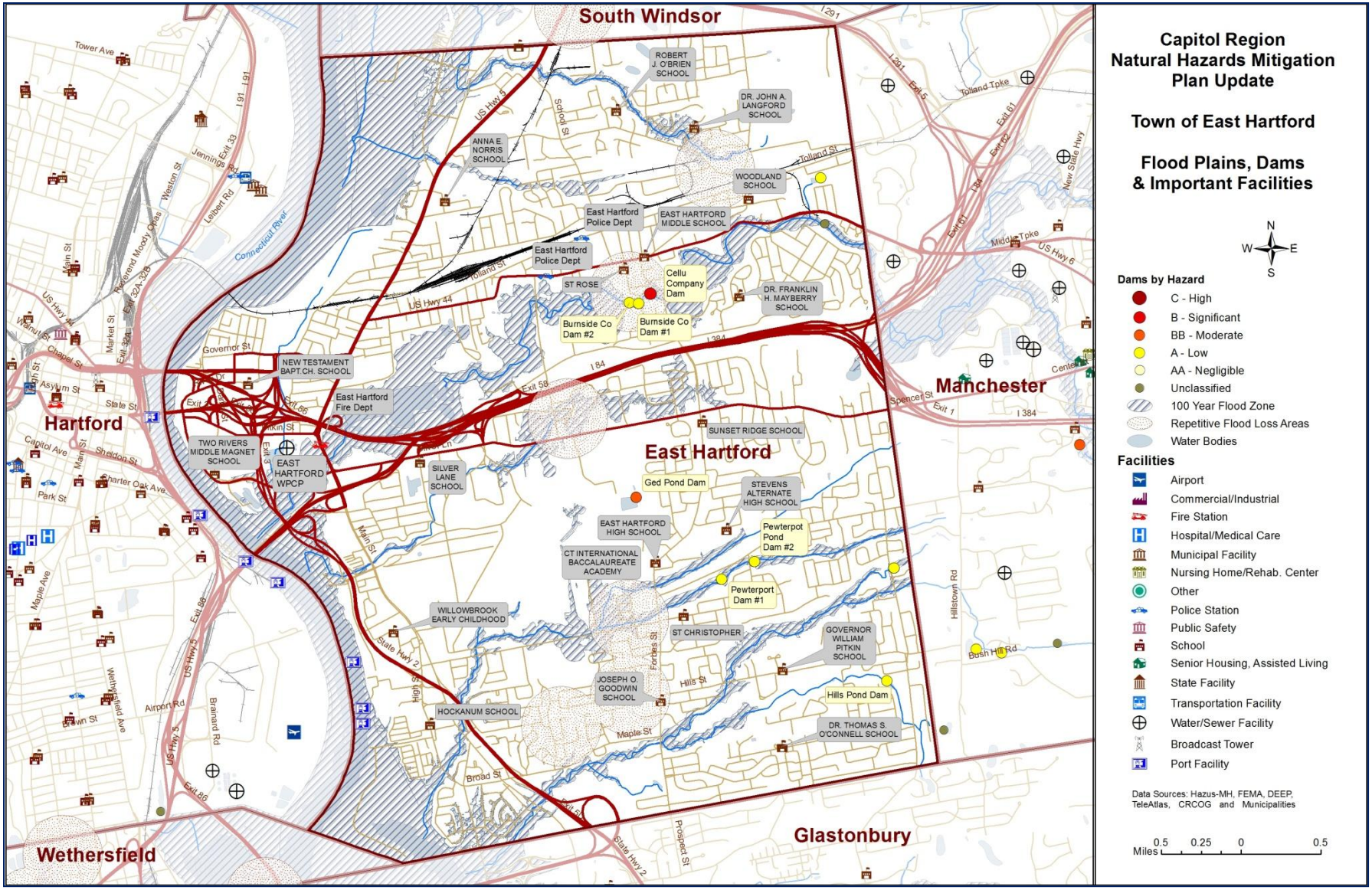
6.1 Implement an educational system for property owners, including insurance education, evacuation strategies and business continuity planning.

Lead: Emergency Management, Administration
Priority: Medium
Status: This remains a medium priority. There has not been significant effort to meet this objective although the Town posts flood awareness and insurance information on its website. In 2008, East Hartford amended its flood zone regulations to maintain eligibility with the National Flood Insurance Program. Educational efforts will be developed and undertaken during the 2014-2019 planning period.
Potential Funding Sources: Town general fund
Timeframe: 2014-2019

Map 22: East Hartford Population Density, Dams and Flood Zones



Map 23: East Hartford Flood Plains, Repetitive Loss Areas, Dams and Important Facilities



East Windsor

East Windsor has a population of about 11,400, and a land area of 26.3 square miles. Daytime population is estimated to increase to approximately 13,250 due to people entering the town for employment purposes. Population density is approximately 412 persons per square mile, however 60 percent of the residents are concentrated in the Warehouse Point area of town in the northwest section and 40 percent are located principally in the Broad Brook area in the eastern-central section of town.

Situated on the east side of the Connecticut River, the town lies at an elevation of about 160 feet. The eastern portion of town is within the Scantic River Watershed, while the western portion lies in the Connecticut Main Stem basin. Both the Connecticut and Scantic Rivers run through East Windsor, along with several tributaries including Broad, Chestnut, Ketch, Namerick and Spring Glen Brooks.

Interstate 91 crosses the northwest corner of East Windsor. State Route 5 is a major north-south thoroughfare, while State Routes 140 and 191 provide east-west access. Principal industries include: agriculture, support system facilities, and manufacture of small tools, paper boxes, electronics, aluminum by-products, farm implements and fertilizers.

The form of government in East Windsor is Selectmen, Town Meeting, Board of Finance, and a five person Board of Selectmen. The First Selectman is the Chief Executive Officer, Chairman of the Board of Selectmen and a full-time official of the town.

Law enforcement is provided by a full-time paid force of 24 regular officers including a Chief, a Deputy Chief, a Lieutenant, and five sergeants. In addition, there are five dispatchers, an Administrative Assistant, a Records Manager and a part-time Records Clerk.

Fire service is provided by two volunteer fire departments that are partially funded by the town. They are the Warehouse Point Volunteer Fire Department Inc. with 50 firefighters, under the command of an appointed chief, and six vehicles and one boat; the Broad Brook Volunteer Fire Department Inc. with 54 firefighters and six vehicles. All vehicles are radio equipped and on the fire frequency and both fire stations have auxiliary generating equipment for emergency power.

For emergency medical response the Town of East Windsor contracts the East Windsor Ambulance Association. The East Windsor Ambulance Association is licensed to operate five ambulances and three paramedic intercept vehicles. Two of their ambulances are staffed at the paramedic level 24 hours a day, 7 days a week.

The Emergency Management Agency has a part-time director and substantial equipment for use in disaster situations. There is a volunteer staff made up of 30 members, six of which also serve as the Advisory Council.

Challenges

The Town of East Windsor is vulnerable to many types of disaster including hurricane effects, severe wind and ice storms, electrical storms, blizzards, floods, power outages, forest and wild land fires,

chemical and other hazardous materials incidents/accidents, explosions, air disasters and transportation accidents. Tornadoes, earthquakes, public demonstrations, civil disturbances and enemy attack must also be considered as potential disaster possibilities. Motor transportation accidents involving chemicals, radioactive materials, flammable substances and other dangerous materials must also be considered since Interstate 91, U.S. Route 5 and State Route 140 pass through the town. The town is vulnerable to possible aircraft accidents on landing and take-off in view of the close proximity of Bradley International Airport to the community.

According to information from the Connecticut Department of Emergency Management and Homeland Security, the three federally declared natural disasters of 2011 resulted in total expenses to the municipality and other local agencies of nearly $450,000. These expenses include debris and snow removal, emergency protective measures and repairs to damaged infrastructure and buildings but do not include damages experienced by private citizens and businesses.

2011 Disasters Damage Amounts Eligible for 75% Reimbursement Under FEMA Public Assistance Program				
Applicant: Town & Other Agencies (i.e., Fire Districts, Schools, and Private Non-Profit Agencies)	**100% of Amount Eligible for 75% Reimbursement**			**Total Damages Eligible for Public Assistance Due to 2011 Disasters**
	DR-1958-CT 2011 Snow	**DR-4023-CT (Irene) August 2011**	**DR-4046-CT Severe Weather Oct 2011 (Alfred)**	
Town of East Windsor	$36,736.12	$118,773.41	$282,704.32	$438,213.85
East Windsor Other	$1,874.34		$8,855.44	$10,729.78
East Windsor Total	**$38,610.46**	**$118,773.41**	**$291,559.76**	**$448,943.63**

Flooding is a concern for East Windsor and the Town has taken steps to reduce its vulnerability to flooding. Since the adoption of the 2008 Plan, no new structures have been approved in the special flood hazard zone and a residential structure in the floodplain on North Water Street was recently removed through a demolition order. The National Flood Insurance Program paid 23 property damage claims in East Windsor totaling $281,502 to-date. East Windsor has not had any Repetitive Loss Property claims filed to-date. A significant flood event could result in much damage. CRCOG used FEMA's Hazus-MH model to analyze the risks that the Town of East Windsor might face from flooding. The model estimates that economic losses to the town including residential and commercial damage and business interruptions due to a flood having a 1% chance of occurring any given year (the 100-year flood) would be nearly $18 million. The impacts of such a flood are summarized below:

Estimated Damages from 100-Year Flood	Households Displaced	164
	People Needing Shelter	346
	Buildings at Least Moderately Damaged	26
	Total Estimated Economic Losses	$17,970,000
	Total Residential Building & Content Losses	$13,370,000
	Total Commercial, Industrial & Other Building & Content Losses	$4,590,000
	Total Business Interruption Losses	$10,000

CRCOG also used FEMA's Hazus-MH model to analyze the risks that the Town of East Windsor might face from a hurricane as powerful as the 1938 hurricane. The model estimates that economic losses to

the town including residential and commercial damage and business interruptions due to such a Category 3 hurricane would be over $52 million. The impacts of such a storm are summarized below:

Estimated Damages from a 1938 Strength Hurricane	Households Displaced	271
	People Needing Shelter	73
	Buildings at Least Moderately Damaged	22
	Buildings Completely Damaged	4
	Total Estimated Economic Losses	$52,460,000
	Total Residential Building Losses	$35,830,000
	Total Commercial, Industrial & Other Building Losses	$10,250,000
	Total Business Interruption Losses	$6,380,000
	Total Debris Generated	36,294 tons
	Truckloads (at 25 tons/truck) of building debris	218

Shelter capacity in the event of a major disaster is a concern for the Town. Risk Assessment flood model data suggests that in the event of a 10-Year flood the Town of East Windsor will have emergency shelter needs for approximately 230 people. In the event of a 100-Year flood the Town will need to shelter approximately 350 people. In the event of a 500-Year flood the Town will need to shelter approximately 450 people.

The public fallout shelter in East Windsor is limited to 13 in Category 2 spaces in the Broad Brook School on Rye Street. In addition, the survey of Home Fallout Shelter capability made by the Federal Government revealed 6,457 spaces in Category 1 that could be improved to equal the requirement for public shelter and 399 spaces in Category 2 that are equal to the standard for public shelter. In all cases a space is considered to be 10 square feet per person. The small amount of approved Public Fallout Shelters existing in the town would indicate the necessity for an effective evacuation plan to move residents to less vulnerable areas.

The existence of nuclear weapons creates the potential for a nuclear accident/incident or enemy/terrorist attack. In a nuclear attack situation, East Windsor is considered to be at "blast risk" in accordance with the criteria outlined in the Federal Emergency Management Agency (FEMA) document NAPB-90 (Nuclear Attack Planning Base-1990). Public fallout shelter capacity in East Windsor is limited to 13 spaces in Category 2.

Goals, Objectives and Strategies

GOAL: ENSURE SAFETY OF RESIDENTS AND PROPERTIES DURING PROLONGED POWER OUTAGES CAUSED BY WINTER STORMS, HURRICANES (HIGH WINDS), OTHER NATURAL DISASTERS, AND MANMADE DISASTERS SUCH AS TERRORISM OR ACCIDENTS.

(Note: this is a new goal incorporating proposals included in the 2008 plan to maintain special needs population lists, train staff on the Reverse-911 system and use town media for public outreach, as well as proposing new initiatives to strengthen shelter capabilities and ensure backup power at critical facilities.)

Objective 1:
Ensure reliable alternative power sources at key government buildings.

Lead: Emergency Management
Priority: High
Current Status: In progress

Strategic Action:

1.1 Obtain funding through grant opportunities and Town appropriation to place new gen-sets in High School, Town Garage (replace), Scout Hall and Broad Brook Middle School.
Lead: Emergency Management and First Selectmen's Office
Priority: High
Status: Identified in 2013-2014 Capital Improvements Plan.
Potential Funding Source: Grants, local revenue
Timeframe: Seek funding in 2014; completion is anticipated by 2015.

Objective 2:
Identify special needs individuals and establish means of communicating with the public.
Lead: Emergency Management, Police and Human Services
Priority: High
Status: In progress

Strategic Actions:

2.1 Continue to maintain special needs population lists.
Lead: Fire and Police, & Human Services
Priority: High
Status: In progress; this is an established practice.
Potential Funding Source: local revenue
Timeframe: Annual updates are anticipated throughout 2014-2019

2.2 Familiarize town staff with Reverse-911 as system implementation begins.
Lead: Emergency Management, Police, Fire
Priority: Medium
Status: In progress
Potential Funding Source: local revenue
Timeframe: 2014-2019

2.3 Use town media, including newsletter, website and other means to educate residents on personal planning for emergencies.
Lead: Emergency Management and First Selectmen's Office
Priority: Medium
Status: In progress; this is an established practice.
Potential Funding Source: local revenue
Timeframe: Annual updates are anticipated throughout 2014-2019

Objective 3:
Maintain existing generator equipment.

Lead: Emergency Management
Priority: High
Status: Completed

Strategic Action:

3.1 Obtain service contracts and maintain gen-sets at Police Department, Town Garage, Town Hall, Broad Book Fire, and the Prospect Hill Antenna site.
Lead: Emergency Management and First Selectmen's Office
Priority: High
Status: In progress. It is anticipated contracts will be funded through annual budget process
Potential Funding Source: local revenue
Timeframe: 2014-2019

Objective 4:
Establish the East Windsor High School as a fully functional emergency shelter.

Lead: Emergency Management
Priority: High
Status: In Progress

Strategic Actions:

4.1 Maintain commitment from electrical contractor to supply 60 kW generator in times of mass power outage.
Lead: Emergency Management and First Selectmen's Office
Priority: High
Status: In progress
Potential Funding Source: local revenue
Timeframe: To be established in 2014

4.2 Training and continue to train shelter staff associated with Emergency Management.
Lead: Emergency Management
Priority: Medium
Status: In progress
Potential Funding Source: local revenue
Timeframe: 2014-2019: to be undertaken annually

4.3 Recruit more volunteers for shelter staff.
Lead: Emergency Management
Priority: Medium
Status: In progress
Potential Funding Source: local revenue
Timeframe: 2014-2019: to be undertaken periodically

GOAL: REDUCE THE LOSS OF LIFE AND ECONOMIC CONSEQUENCES FROM WINTER STORMS.

Objective 1:
Improve the ability to clear roads by increasing public works staff.

Lead: Public Works
Priority: High
Status: In progress

Objective 2: Maintain equipment and supplies for treating roads.

Lead: Public Works
Priority: High
Status: In progress

Strategic Action:

2.1 Maintain adequate material in newly constructed salt shed.
Lead: Public Works
Priority: Medium
Status: In progress
Potential Funding Source: local revenue
Timeframe: 2014-2019: funding to be sought annually through budget process

Objective 3:
Reduce the amount of debris through preventative tree maintenance.

Lead: Public Works
Priority: High
Status: In progress

Strategic Actions:

3.1 Continue regular tree maintenance, including documentation and notification of issues in CL&P utility right-of-way.
Lead: Public Works
Priority: High
Status: In progress; this is an established practice.
Potential Funding Source: local revenue
Timeframe: 2014-2019: funding to be sought annually through budget process

3.2 Continue to use private contractors for emergency debris removal.
Lead: Public Works and First Selectmen's Office
Priority: Medium
Status: In progress; this is an established practice.
Potential Funding Source: local revenue
Timeframe: 2014-2019: funding to be sought annually through budget process

GOAL: REDUCE LOSS OF LIFE AND PROPERTY AND ECONOMIC CONSEQUENCES OF HIGH WIND EVENTS

Objective 1:
Reduce damages to municipal buildings through regular maintenance.

Lead: Public Works
Priority: High
Status: In progress

Strategic Actions:

1.1 Devise and implement a regular building inspection and maintenance program.
Lead: Public Works and Building Department
Priority: Medium
Status: In progress. Program will continue to be implemented on a sustained basis.
Potential Funding Source: local revenue
Timeframe: 2014-2019

Objective 2:
Improve ability of emergency responders to prepare and respond to wind events.

Lead: Police, Fire, EMS, and Emergency Management
Priority: High
Status: In progress

Objective 3:
Reduce debris through preventative tree maintenance.

Lead: Public Works
Priority: High
Status: In progress

Strategic Actions:

3.1 Continue regular tree maintenance, including documentation and notification of issues in CL&P utility right-of-way.
Lead: Public Works
Priority: High
Status: In progress; this is an established practice.
Potential Funding Source: local revenue, utility
Timeframe: 2014-2019: funding to be sought annually through budget process

3.2 Continue to use private contractors for emergency debris removal.
Lead: Public Works and First Selectmen's Office
Priority: Medium
Status: In progress; this is an established practice.
Potential Funding Source: local revenue
Timeframe: 2014-2019: funding to be sought annually through budget process

GOAL: REDUCE LOSS OF LIFE AND PROPERTY AND ECONOMIC CONSEQUENCES FROM FLOODING

Objective 1:
Reduce the likelihood of flooding by improving existing natural and artificial drainage systems.

Lead: Public Works
Priority: High
Status: In progress

Strategic Actions:

1.1 Conduct study of dam on Main Street near Depot Street intersection, using previously awarded funds.
Lead: Public Works, Engineering
Priority: High
Status: In progress
Potential Funding Source: local revenue
Timeframe: To be completed 2013-2014

1.2 Implement recommendations from the above study.

Lead: Public Works, Engineering, Administration
Priority: Medium
Status: Deferred while funding is sought; grant funding through State sought in fall 2013. To be undertaken upon completion of the study and availability of funding
Potential Funding Source: local revenue; grants
Timeframe: 2014-2019

1.3 Implement recommendations of Natural Resources Conservation Service, including installation of a detention basin in Windsorville Road/East Road area to reduce road closures and washouts.

Lead: Public Works, Engineering, Administration
Priority: Medium
Status: Deferred while funding is sought. Efforts to develop a work plan and seek funding through annual budget process will be undertaken during the 2014-2019 planning period
Potential Funding Source: local revenue
Timeframe: 2014-2019

1.4 Work with property owners, contractors and the DEEP to regularly remove beaver dams causing flooding problems.

Lead: Public Works, Inland Wetlands
Priority: Medium
Status: In Progress; this is an established, long term and sustained effort which is undertaken on an as needed basis.
Potential Funding Source: local revenue
Timeframe: 2014-2019

1.5 Investigate and consider purchasing residential properties located in floodplains, as they come up for sale.

Lead: Emergency Management
Priority: Low
Status: Not a viable option at this time because the Town lacks the necessary capital.
Potential Funding Source: local revenue
Timeframe: Suspended for the duration of the 2014-2019 planning period; may be considered in the future if circumstances warrant.

1.6 Consider replacing East Road and Melrose Road bridges.

Lead: Emergency Management, Planning
Priority: Low
Status: East Road culvert work completed 2009-2010.
Melrose Road Bridge is not considered a viable option at this time because the Town lacks the necessary capital.

Potential Funding Source: local revenue
Timeframe: Suspended for the duration of the 2014-2019 planning period; may be considered in the future if circumstances warrant.

Objective 2:
Reduce debris through preventative tree maintenance.

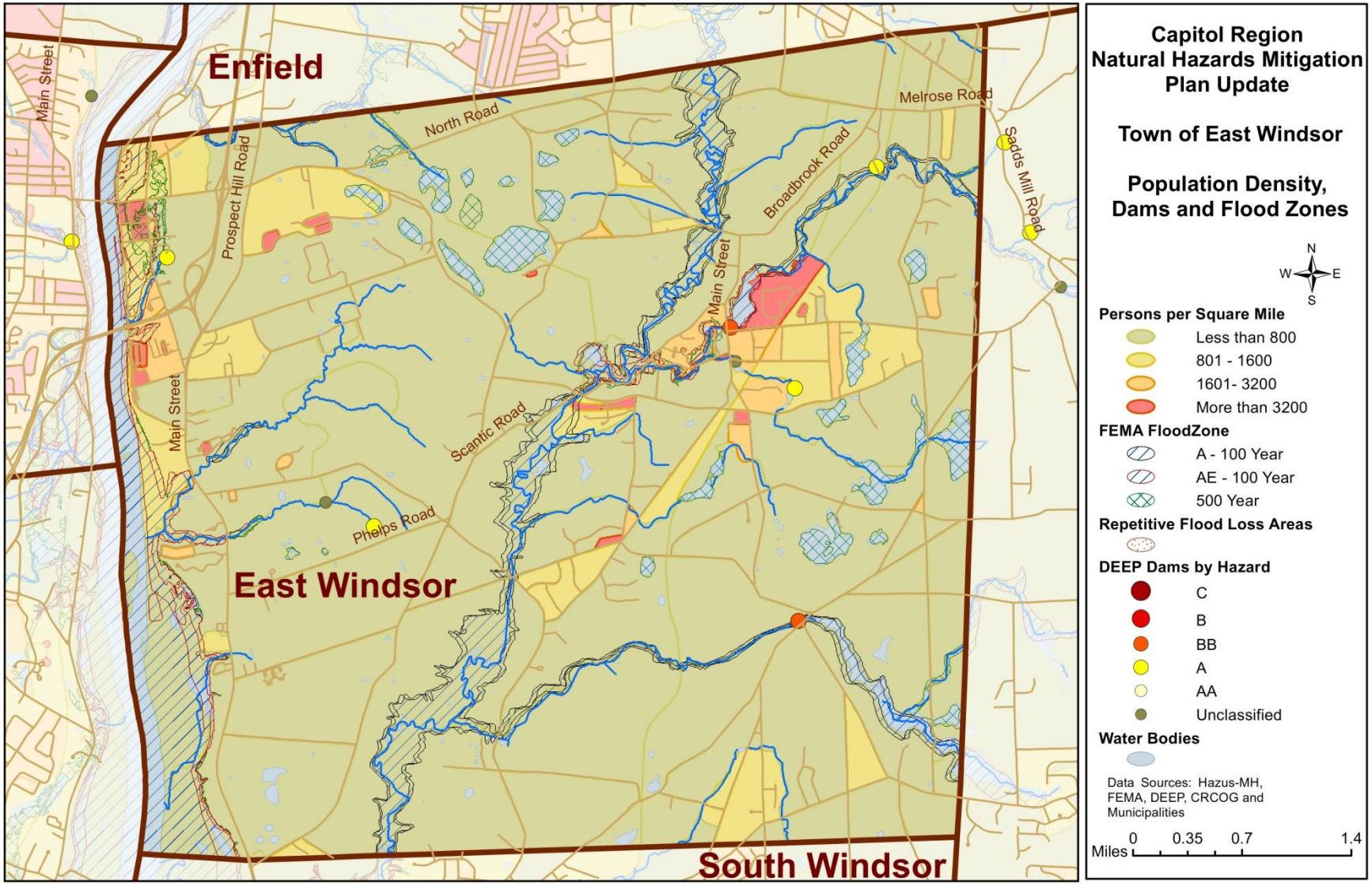
Lead: Public Works
Priority: High
Status: In progress

Strategic Actions:

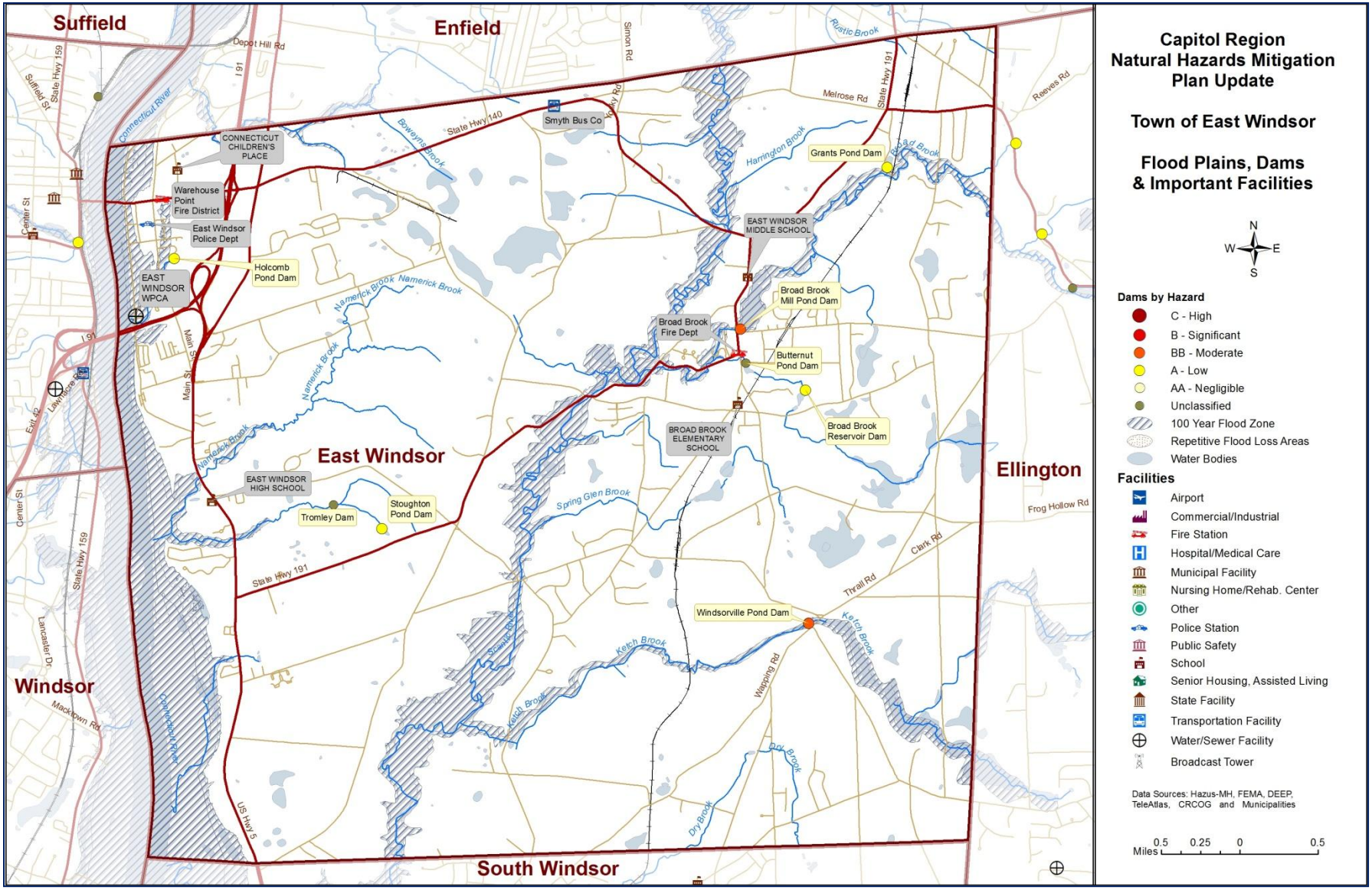
2.1 Continue regular tree maintenance, including documentation and notification of issues in CL&P utility right-of-way.
Lead: Public Works
Priority: High
Status: In Progress; this is an established practice.
Potential Funding Source: local revenue, utility
Timeframe: 2014-2019: funding to be sought annually through budget process

2.2 Continue to use private contractors for emergency debris removal.
Lead: Public Works and First Selectmen's Office
Priority: Medium
Status: In Progress; this is an established practice.
Potential Funding Source: local revenue
Timeframe: 2014-2019: funding to be sought annually through budget process

Map 24: East Windsor Population Density, Dams and Flood Zones



Map 25: East Windsor Flood Plains, Repetitive Loss Areas, Dams and Important Facilities



Ellington

Ellington is a growing community located in Tolland County. The town covers 34 square miles with a population of approximately 15,600. Ellington lies at an elevation between 100 and 800 feet above sea level and is part of three watersheds, the Scantic to the west, the Hockanum in the middle, and the Willimantic to the east. Principal watercourses that run through Ellington include Broad, Charters, Creamery, Kimball's, Marsh, Martins and Muddy Brooks. With over 5,500 acres under cultivation, Ellington remains one of the largest agricultural production towns in Connecticut. Major thoroughfares in Ellington include north-south state route 83 and east-west state route 140. The eastern highlands ridgeline runs through the central part of town. This area contains extensive areas of upland forest including more than 1,200 acres of the Shenipsit State Forest.

Challenges

For Ellington, the natural hazards of most importance, and those having the greatest impact on the community, are winter storms and hurricanes/tropical storms. No new construction or demolition has occurred since 2008 in floodplains or other vulnerable areas. No changes have been made to zoning, floodplain or inland wetlands regulations since 2008 which would increase or decrease Ellington's vulnerability to natural hazards. Most critical municipal facilities are located within a two mile radius in the Town's center. A major challenge, as verified by most recent storms, is maintaining public/emergency access from town center out toward the Crystal Lake community. Access is essential via State Routes 140 and 30. During times of lengthy town-wide power outages access to fuel could be limited by lack of generator power at fuel distribution facilities in and around town.

According to information from the Connecticut Department of Emergency Management and Homeland Security, the three federally declared natural disasters of 2011 resulted in total expenses to the municipality and other local agencies of over $750,000. The majority of these costs were incurred as a result of Storm Alfred which hit in late October while leaves were still on the trees. These disaster related expenses include debris and snow removal, emergency protective measures and repairs to damaged infrastructure and buildings but do not include damages experienced by private citizens and businesses.

2011 Disasters Damage Amounts Eligible for 75% Reimbursement Under FEMA Public Assistance Program				
Applicant Town & Other (Other = Fire Districts, Schools, Private Non-Profit Agencies)	100% of Amount Eligible for 75% Reimbursement			Total Damages Eligible for Public Assistance Due to 2011 Disasters
	DR-1958-CT 2011 Snow	DR-4023-CT Irene August 2011	DR-4046-CT Severe Weather Oct 2011 Alfred	
Town of Ellington	$77,625.51	$44,076.23	$620,025.07	$741,726.81
Ellington Other			$16,231.20	$16,231.20
Ellington Total	**$77,625.51**	**$44,076.23**	**$636,256.27**	**$757,958.01**

CRCOG used FEMA's Hazus-MH model to analyze the risks that the Town of Ellington might face from a hurricane as powerful as the 1938 hurricane. The model estimates that economic losses to the town including residential and commercial damage and business interruptions due to such a Category 3 hurricane would be over $87 million. The impacts of such a storm are summarized below:

Estimated Damages from a 1938 Strength Hurricane	Households Displaced	65
	People Needing Shelter	9
	Buildings at Least Moderately Damaged	699
	Buildings Completely Damaged	54
	Total Estimated Economic Losses	$87,370,000
	Total Residential Building Losses	$63,640,000
	Total Commercial, Industrial & Other Building Losses	$14,245,000
	Total Business Interruption Losses	$9,485,000
	Total Debris Generated	57,551
	Truckloads (at 25 tons/truck) of building debris	314

The National Flood Insurance Program has paid four property damage claims in Ellington totaling $8,954 to-date; none have been Repetitive Loss Property claims. A significant flood event could result in much damage. CRCOG used FEMA's Hazus-MH model to analyze the risks that the community might face from a major flood. The model estimates that economic losses to the town including residential and commercial damage and business interruptions due to a flood having a 1% chance of occurring any given year (the 100-year flood) would be over $ 11 million. The impacts of such a flood are summarized below:

Estimated Damages from 100-Year Flood	Households Displaced	132
	People Needing Shelter	130
	Buildings at Least Moderately Damaged	none
	Total Estimated Economic Losses	$11,120,000
	Total Residential Building & Content Losses	$1,620,000
	Total Commercial, Industrial & Other Building & Content Losses	$9,460,000
	Total Business Interruption Losses	$40,000

Goals, Objectives and Strategies

GOAL: REDUCE ECONOMIC AND SOCIAL IMPACT CAUSED BY LOSS OF POWER

Objective 1:
Provide auxiliary power to critical facilities.

Strategic Actions:

1.1 Work with the Capitol Region Emergency Planning Commission to obtain generators for all five schools and town hall complex.
Lead: Emergency Management
Priority: High
Status: Four of five schools completed since 2011; Windermere School and the Library remain. The Annex building containing land use offices needs physical connection to Town Hall generator.
Potential Funding Source: grants
Timeframe: 2014-2019

1.2 Complete strategic plan for evacuating and sheltering special needs populations with emphasis on sheltering in place for those not able to get to designated shelters (i.e. Snipsic Village Community Building)
Lead: Emergency Management
Priority: High
Status: Plans are in place to connect a generator to Snipsic Village Community Building for electric and water service and heat. Trained persons have to transport residents to and from the community building
Potential Funding Source: grants or other funding (i.e. CIP)
Timeframe: 2014-2019

1.3 Encourage private fuel dispensaries to install back-up generator power to ensure continued access to fuel for residential and business transportation, heating/cooling and power needs.
Lead: Emergency Management
Priority: High
Status: This is a new initiative.
Potential Funding Source: Town general fund for municipal staff time; private (fuel companies) funds for equipment and installations.
Timeframe: 2014-2019.

Objective 2:
Continue to provide adequate equipment for clean-up initiatives.

After Storm Alfred, the Town established a list of on-call contractors and available equipment (through competitive bidding) for assistance when needed.

GOAL: MINIMIZE DAMAGE RESULTING FROM FLOODING

Objective 1:
Ensure infrastructure is constructed to FEMA standards.

Strategic Actions:

1.1 Continue to work with CRCOG to advance Windermere Bridge renovation project on DOT list.
Lead: Administration
Priority: High
Status: Completed in 2008

1.2 Work with State DOT to ensure safe/emergency vehicular passage to the Crystal Lake community prior to, during and after storms (Routes 140 and 30).
Lead: Administration
Priority: High
Status: Although this is a new initiative for the Plan Update, emergency contact lists have been established between the Department of Public Works, CL&P and tree

removal services. Mutual aid packs are in effect and coordinated through a regional dispatch center.

Potential Funding Source: State

Timeframe: 2014-2019: annual updates to the list are anticipated.

1.3 Continue to work with CRCOG to advance Route 74 bridge renovation project on DOT list in Vernon.

Lead: Administration

Priority: High

Status: This is a new Initiative

Potential Funding Source: State

Timeframe: 2014 - 2015

Objective 2:

Ensure buildings are constructed to FEMA standards.

Strategic Action:

2.1 Continue to implement and enforce local building and zoning regulations to prevent development in risk-prone areas.

Lead: Planning, Building

Priority: High

Status: This work is undertaken routinely as part of the development review and construction inspection processes. Reviews are conducted as development applications and building permits are received.

Potential Funding Source: General fund

Timeframe: 2014-2019

Objective 3:

Protect the integrity of "Great Swamp" and other wetlands from development pressure.

Strategic Action:

3.1 Educate public on property owners' responsibility to maintain drainage systems.

Lead: Public Works, Administration

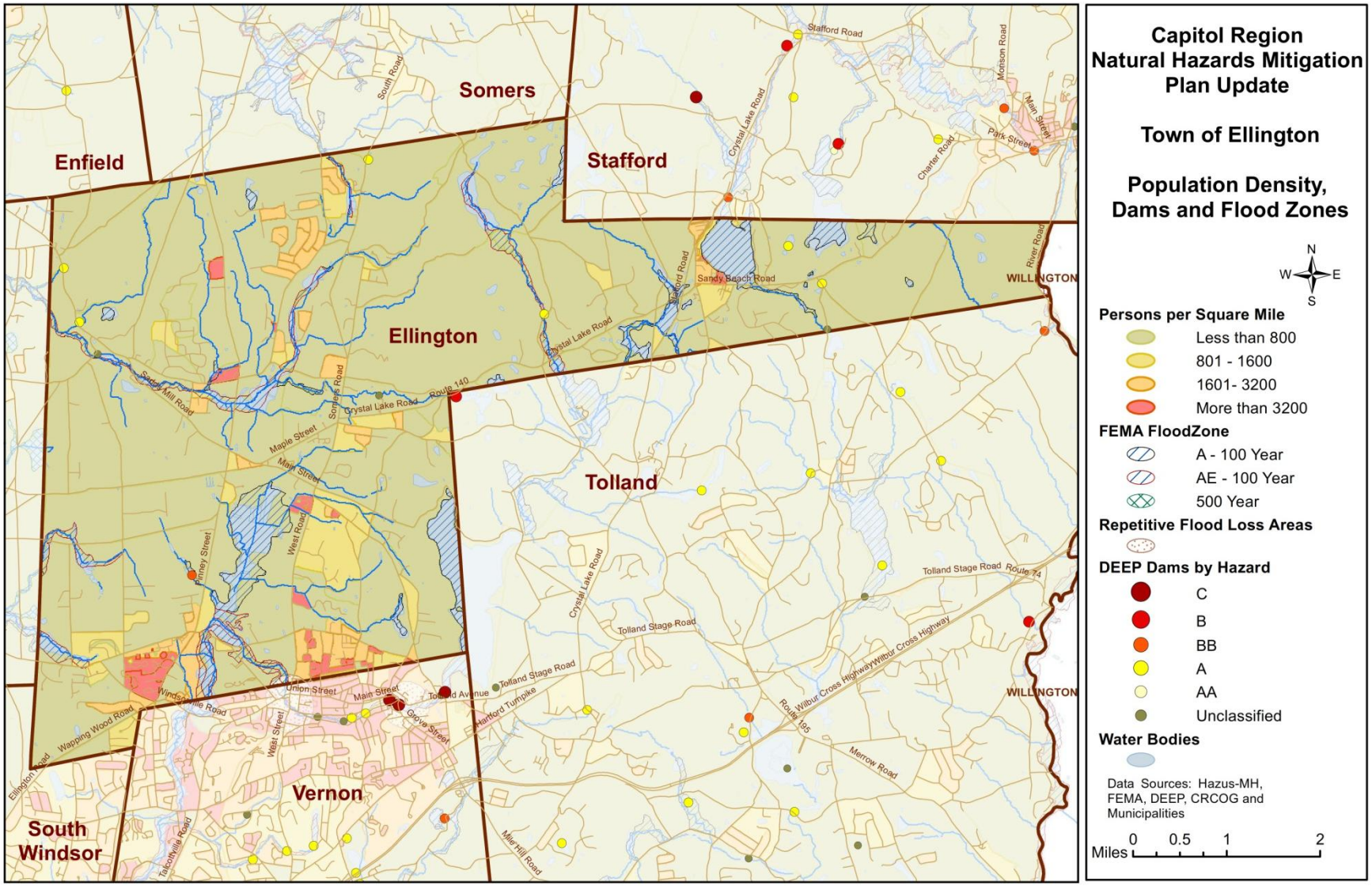
Priority: Low

Status: Information has been periodically sent to residents via a town newsletter

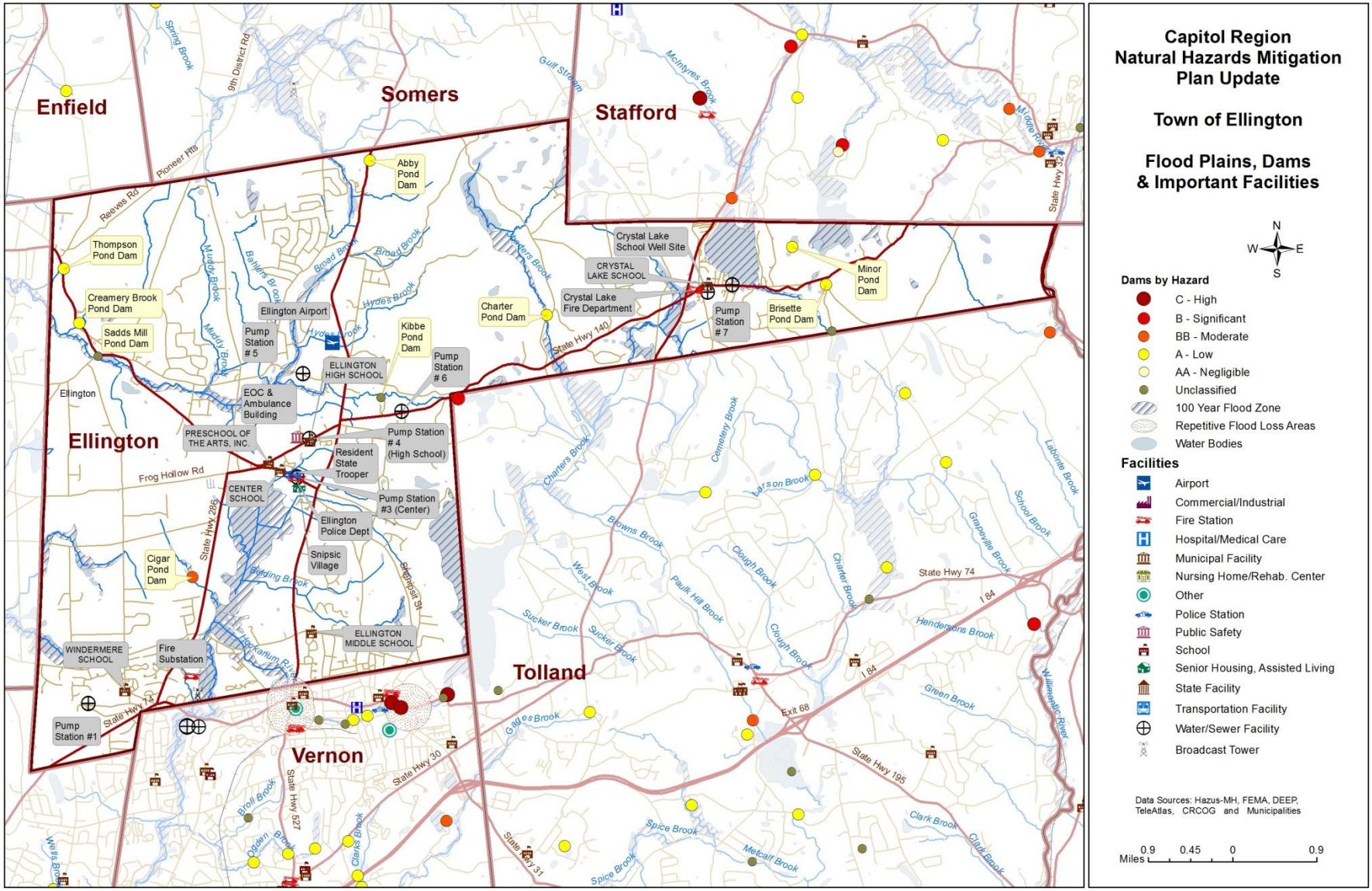
Potential Funding Source: General fund

Timeframe: 2014-2019; annual efforts are anticipated.

Map 26: Ellington Population Density, Dams and Flood Zones



Map 27: Ellington Flood Plains, Repetitive Loss Areas, Dams and Important Facilities



Enfield

The Town of Enfield encompasses 33.4 square miles with an estimated population of approximately 44,600 people. Enfield is located along the Massachusetts border and is both in the main stem of the Connecticut River Watershed (eastern drainage) and the Scantic River Watershed which drains to the west. Elevation is approximately 154 feet above sea level. The main watercourses include the Grape, Pierce and Terry Brooks as well as the Connecticut and Scantic rivers. Parks in Enfield include: Powder Hollow Park, Scantic River State Park, Lafayette Park, and Hazardville Historic District. Interstate 91 travels north-south in Enfield while other main transportation routes are 190, 192 and 220. Industries include insurance, manufacture of toys, water filtration systems, specialized machinery, aluminum and magnesium castings, wooden reels for wire and cables, silk screening, games, greeting cards, tools and gauges, envelopes, laser beam welding, warehouse distribution of toys, clothing and pharmaceuticals, manufacture of electronic assemblies, processing of food and dairy products, ice cream, vegetable and tobacco farming.

Existing Strategies

The Town adopted a Flood Hazard Mitigation Plan (FHMP) in 2000 to assist the community in identifying localized flood prone areas, flood hazards and risks, and strategies for preventing the loss of life and reducing property damages. The Town updated and incorporated its FHMP into the 2008 Natural Hazards Mitigation Plan.

The Town of Enfield has several structural and regulatory flood mitigation tactics currently in place. The Town issued floodplain permits for 13 projects including applications to widen and replace bridges over the Scantic River. Other applications included temporary mobile offices, a loading dock, building additions, parking area modifications, and the rebuilding of an existing house. The Town requires flood compensation on all applications. There are several water bodies that still pose potential flood hazards. Beemans Brook, Waterworks Brook, Grape Brook, Freshwater Brook, Jawbuck Brook, Shaker Lake, Terry Brook, Boweyns Brook, Buckhorn Brook, and the Connecticut River are some of the major watercourses that have been researched for their previous flooding history and their current flooding potential.

The Town has completed, or is currently working on, most of the planned mitigation projects included in the 2000 FHMP, including drainage system improvements, dredging, catch basin cleanings, GIS implementation, and property acquisitions among other things. Equally important to these structural and property remedies are the education and outreach efforts that Enfield has made. All-hazard workshops are offered twice a year for emergency management personnel and non-profit organizations, and flood insurance policy seminars are available for homeowners.

The Town has also initiated a planning team to study and make recommendations to the Town Council regarding drainage and erosion capital improvement projects. Members of the team include staff from Public Works, Engineering, Highway, Finance, Planning and the Town Manager's office.

Challenges

Flooding remains the most significant hazard affecting the community. The National Flood Insurance Program has paid 55 property damage claims in Enfield totaling $292,021 to-date. Enfield has had fifteen Repetitive Loss Property claims to-date on six properties totaling $169,140.

The Town experienced significant flooding in October 2005, when the area received two significant rainfalls in a one-week period. Interstate 91 in Enfield was flooded and closed. Areas of Route 5 and the Enfield Square Mall, in addition to numerous residential areas also suffered severe flooding. The closure of the Interstate and flooding on Route 5 (the other major north-south route) resulted in serious traffic congestion that endangered public safety as emergency vehicles could not get through. The total damages to town infrastructure amounted to more than $800,000. FEMA eventually awarded the Town disaster aid to help cover the costs of repairs to municipal infrastructure.

CRCOG used FEMA's Hazus-MH model to analyze the risks that the Town of Enfield might face from a major flood. The model estimates that economic losses to the town including residential and commercial damage and business interruptions due to a flood having a 1% chance of occurring any given year (the 100-year flood) would be over $91 million. The impacts of such a flood are summarized below:

Estimated Damages from 100-Year Flood	Households Displaced	1,197
	People Needing Shelter	578
	Buildings at Least Moderately Damaged	135
	Total Estimated Economic Losses	$91,120,000
	Total Residential Building & Content Losses	$39,020,000
	Total Commercial, Industrial & Other Building & Content Losses	$51,720,000
	Total Business Interruption Losses	$45,000

Losses from strong hurricanes would also be significant. The model estimates that economic losses to the town including residential and commercial damage and business interruptions due to a Category 3 hurricane such as the 1938 Hurricane would be over $183 million. The impacts of such a storm are summarized below:

Estimated Damages from a 1938 Strength Hurricane	Households Displaced	71
	People Needing Shelter	10
	Buildings at Least Moderately Damaged	1,509
	Buildings Completely Damaged	89
	Total Estimated Economic Losses	$183,300,000
	Total Residential Building Losses	$131,700,000
	Total Commercial, Industrial & Other Building & Content Losses	$30,400,000
	Total Business Interruption Losses	$21,200,000
	Total Debris Generated	57,113 tons
	Truckloads (at 25 tons/truck) of building debris	756

According to information from the Connecticut Department of Emergency Management and Homeland Security, the three federally declared natural disasters of 2011 resulted in total expenses to the municipality and other local agencies of over $6 million. These expenses (shown in the following table) include debris and snow removal, emergency protective measures and repairs to damaged infrastructure and buildings but do not include damages experienced by private citizens and businesses.

2011 Disasters Damage Amounts Eligible for 75% Reimbursement Under FEMA Public Assistance Program				
Applicant **Town and Other Agencies** **Other = Fire Districts, Schools, & Private Non-Profit Agencies**	**100% of Amount Eligible for 75% Reimbursement**			**Total Damages Eligible for Public Assistance Due to 2011 Disasters**
	DR-1958-CT 2011 Snow	**DR-4023-CT Irene August 2011**	**DR-4046-CT Severe Weather Oct 2011 Alfred**	
Town of Enfield	$99,370.97	$66,936.15	$5,602,310.18	$5,768,617.30
Enfield Other	$19,583.89		$214,754.25	$234,338.14
Enfield Total	**$118,954.86**	**$66,936.15**	**$5,817,064.43**	**$6,002,955.44**

Goals, Objectives and Strategies

GOAL: REDUCE LOSS OF LIFE AND PROPERTY AND NEGATIVE ECONOMIC CONSEQUENCES OF FLOODING

Objective 1:
Implement flood hazard mitigation projects identified in the 2000 Flood Hazard Mitigation Plan and subsequent hazard planning efforts.

The Town of Enfield has pursued a number of approaches to help reduce the community's vulnerability to flooding and prepare for emergencies. Examples of such actions by the Town in recent years include, but are not limited to the following accomplishments:

- Implemented a GIS system which both citizens and staff can access. This database provides detailed information, including wetlands.
- Continued its comprehensive road resurfacing/rebuilding program which was initiated in 2000. Any street contemplated for improvement under this program is also assessed for flooding problems, and corrected where such action is feasible.
- Implemented an erosion control effort for areas of Town vulnerable to rapid slope deterioration, particularly the area along the west bank of the Scantic River with its escarpment soils. One location in particular – Cloud Street has several residential properties threatened due severe erosion from rainfall runoff. An extensive slope stabilization project was implemented and completed in 2010 to save these properties.
- Conducted extensive stream clearing and bank stabilization work in Beeman's Brook which flows through a heavily development residential neighborhood.
- Trained over 150 Town of Enfield employees in the Red Cross Shelter Worker program.
- Established a local television station – E-TV to broadcast emergency alerts with a scrolling banner, commonly referred to as "Chy-Alerts."
- Implemented the Everbridge phone/message alert system to inform citizens of emergency situations in Enfield.
- Established and actively share important information with citizens through social media. Enfield Emergency Management *Facebook* wall presently has over 1,200 "likes."

- Established a Community Emergency Response Team (CERT), whose primary mission is shelter operations, with a secondary mission of providing emergency support such as HAM radio operations.
- Hosted the Capitol Region Full Scale Exercise in May 2010 which simulated an active shooter/hostage situation in a public school. Students (Grades 6, 7, and 8) actively participated in the exercise. This was the second time Enfield has hosted a full-scale exercise for the Capitol Region within 5 years, the first one occurring in May 2005.
- Completely revised its *Inland Wetlands and Watercourses Regulations* in March 2011.
- Continue to reduce the volume of storm-water entering the Town's Water Pollution Control's sanitary sewage system by systematic elimination of infiltration and inflow. Progress in recent years has not been as substantive as in prior time periods due to reduced funding.
- Totally reorganized its land-use review and regulation structure by creating a Development Services Department which is comprised of Planning, Zoning Enforcement, Inland Wetlands, Conservation Commission, Blight Enforcement, Building Code Inspection, Housing Code Enforcement, Economic Development and Community Development (CDBG). Tasked assigned to Development Services is the Assistant Town Engineer who also serves as the Town's NFIP Administrator.

Strategic Actions:

1.1 Continue to pursue funding opportunities to implement remaining projects.

Lead: Various

Priority: High

Status: Enfield's highest priority for flood mitigation is reducing the vulnerability from Freshwater Brook flooding, particularly the section from I-91 to Route 5. Enfield has twice attempted in 2012 to procure funding from the Federal government's Flood Hazard Mitigation Grant program. To date, the Town has not received notification from the State of Connecticut regarding the status of the Town's application. The timeframe to accomplish projects will be based on the award of any hazard mitigation grant funds to Enfield. The Town will continue to seek grant funds to pursue this project.

Potential Funding Sources: Hazard Mitigation Grants

Timeframe: 2014-2019.

1.2 Maintain currency of the Flood Hazard Mitigation Plan.

Lead: Administration

Priority: High

Status: The Town of Enfield will continue to participate in the Capitol Region's Natural Hazard Mitigation Plan efforts and be an active member in this regional collaborative effort.

Potential Funding Sources: Funding to accomplish this strategy will be a combination of general operating funds, Emergency Management Planning Grant (EMPG) funds to support emergency management personnel, Capital Improvement Project funds for major undertakings such as road/drainage improvements, and project-specific grant awards such as those supported under the Flood Hazard Mitigation Grant Program.

Timeframe: 2014-2019

Objective 2:
Ensure that future development does not increase flood risk.

Strategic Actions:

2.1 Continue to review development applications broadly, with administration's input.
Lead: Planning, Administration
Priority: High
Status: The Town reorganized its land-use review and regulation structure by creating a Development Services Department which is comprised of Planning, Zoning Enforcement, Inland Wetlands, Conservation Commission, Blight Enforcement, Building Code Inspection, Housing Code Enforcement, Economic Development and Community Development (CDBG). Development Services is overseen by the Assistant Town Engineer who also serves as the Town's NFIP Administrator. The Town's Inland Wetlands & Watercourses Regulations were comprehensively revised in March 2011 and are now in effect. Additionally, the Town's Plan of Conservation and Development which was adopted in April 2011 identifies number of actions for the Town to undertake or continue to undertake which will help protect sensitive lands, people and infrastructure from flooding. Town Staff has and will continue their development review process which routinely assesses proposed development projects for floodplain, inland wetland and erosion control and sedimentation control impacts. It is recommended this strategic action be retained in Plan Update. This is an established practice which will occur as projects are submitted to the Town of Enfield's Development Services Department over the course of the Town's fiscal year. Site plans and subdivisions will continue to be reviewed for floodplain, inland wetland and erosion control and sedimentation control impacts, as development applications are received throughout the 2014-2019 plan period.
Potential Funding Sources: General operating funds.
Timeframe: 2014-2019

GOAL: REDUCE LOSS OF LIFE AND PROPERTY AND ECONOMIC CONSEQUENCES OF OTHER NATURAL HAZARDS

Objective 1:
Ensure adequate protection of all residents.

Strategic Actions:
1.1 Continue to involve the Visiting Nurses Association, the Housing Authority, and social service agencies in planning and training efforts.
Lead: Administration, Emergency Management
Priority: High
Status: In addition to the accomplishments in the "bullet points" previously listed, Enfield Emergency Management will continue the training and public education

efforts listed in this strategy as public awareness is an ongoing effort. It is recommended this strategic action be retained in Plan Update.

Potential Funding Sources: Funding for this effort is through general operating budgets and the EMPG funds.

Timeframe: Meetings and training will occur at least twice a year during the 2014-2019 plan period.

1.2 Continue to maintain a list of special needs population.

Lead: Police - Communications

Priority: High

Status: This list is routinely updated as information is received on a daily basis. As information is received, the Enfield Public Safety Dispatchers (located at the Police Department) will continue to update their database to reflect citizens with special needs who may require assistance during an emergency. It is recommended this strategic action be retained in Plan Update.

Potential Funding Sources: Funding will come from the Department's annual operating budget.

Timeframe: 2014-2019

1.3 Monitor implementation of Reverse-911 system and use to its greatest potential.

Lead: Administration, Emergency Management

Priority: Medium

Status: Both the Town municipal government and Enfield Public Schools have implemented and are operating reverse telephone notification systems. The Town uses the Everbridge Municipal model and the Schools use School Messenger. Both systems can deliver phone call, e-mails and text messages. It is recommended this strategic action be retained in Plan Update.

Potential Funding Sources: Funding to maintain these systems will continue to come from the organizations' annual operating budgets.

Timeframe: 2014-2019: System updates will take place as required by the vendors and the organizations.

GOAL: REDUCE POWER OUTAGES AND ENSURE SAFETY OF PROPERTY AND LIFE AS A RESULT OF NATURAL HAZARDS

Objective 1:

Establish effective tree maintenance program for town right-of-way.

Strategic Actions:

1.1 Fund and institute routine maintenance of trees in town right-of-way either through town staff or private contractor.

Lead: Public Works, Administration

Priority: Medium

Status: New initiative. A routine program will be established and implemented annually through the budget process as funds become available.

Potential Funding Sources: General Budget

Timeframe: 2014-2019

Objective 2:
Ensure access to power for residents in emergency situations.

Strategic Actions:

2.1 Obtain generators for shelters.
Lead: Emergency Management
Priority: High
Status: This is a newly identified initiative in this plan. Efforts will be undertaken as grant funding becomes available.
Potential Funding Sources: Grants.
Timeframe: 2014-2019

2.2 Educate residents on emergency preparedness and services available in the event of an emergency through town website and workshops.
Lead: Emergency Management, Public Safety
Priority: Medium
Status: Although this is a newly identified initiative in this plan, the Town has offered all-hazard workshops twice a year for emergency management personnel and non-profit organizations, and flood insurance policy seminars are available for homeowners.
Potential Funding Sources: General Budget
Timeframe: All-hazards workshops will be held twice yearly during the 2014-2019 plan period; website to be updated seasonally and before expected storms.

2.3 Modify the Town of Enfield zoning & planning codes and ordinances to require group homes to have an emergency generator to provide power for essential home utilities, i.e. heat, refrigerator, lighting, etc. during power outages, thus enabling the residents to "shelter in place."
Lead: Town of Enfield Development Services
Priority: Medium
Status: This is a new initiative which will require approval by various policy and land-use boards such as the Planning and Zoning Commission. Staff review of this initiative has not been started.
Potential Funding Sources: General Budget
Timeframe: 2014-2016

GOAL: ENSURE CAPACITY OF TOWN TO REMOVE SNOW

Objective 1:
Maintain an adequate staffing and fleet of trucks and equipment to clear roads in a timely manner.

Strategic Actions:

1.1 Upgrade and replace public works fleet.

Lead: Public Works, Administration

Priority: High

Status: This is a newly identified initiative in this plan. Implementation will be according to Vehicle Replacement Plan and subject to available funding

Potential Funding Sources: Surplus funding, sale of existing equipment, bonding, lease purchase, military surplus

Timeframe: 2014-2019

1.2 Fund adequate staff and private labor.

Lead: Public Works, Administration

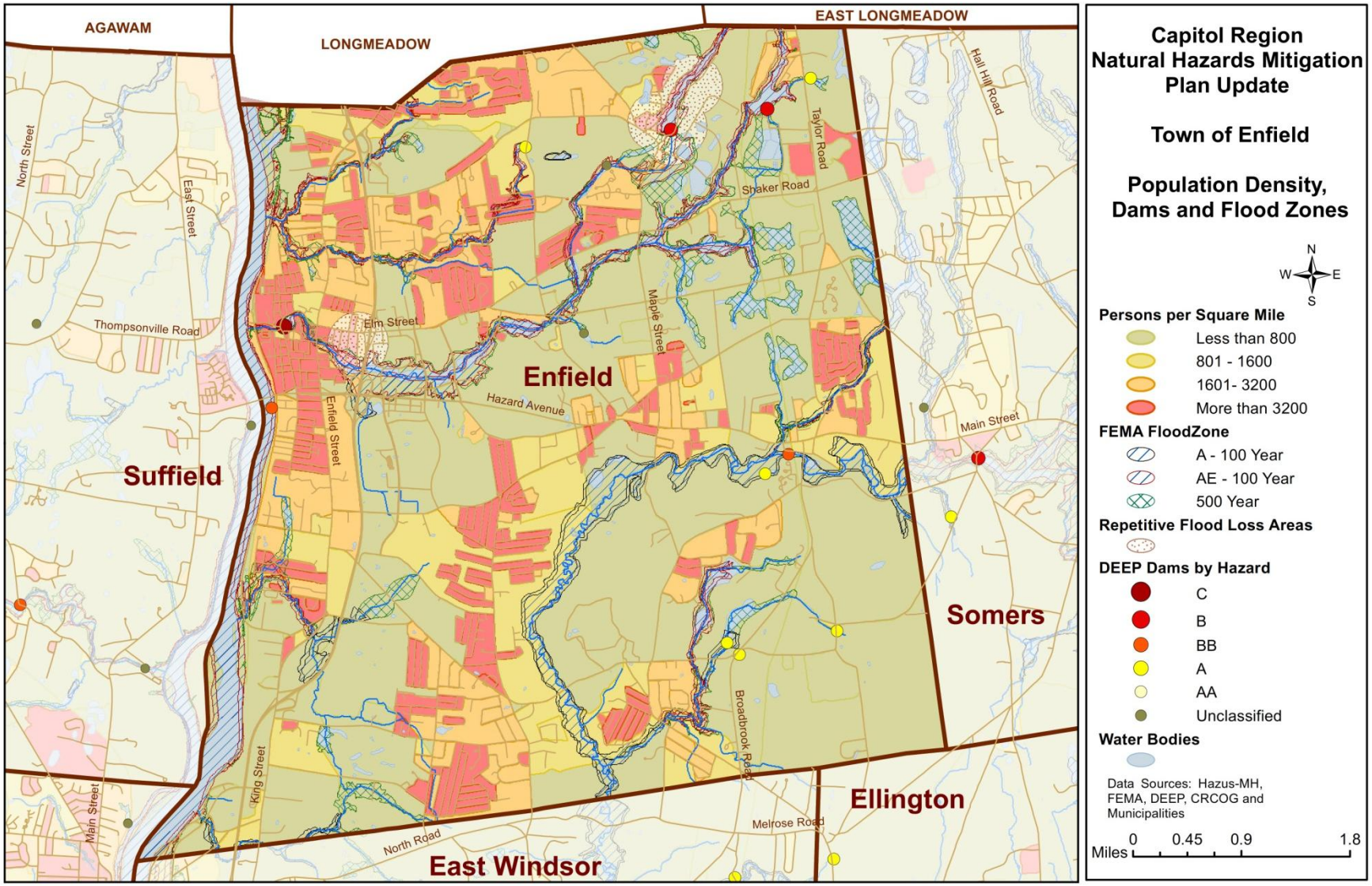
Priority: Medium

Status: This is a newly identified initiative in this plan; however, the town has a current policy of maintaining on on-call list of private contractors to assist with snow removal.

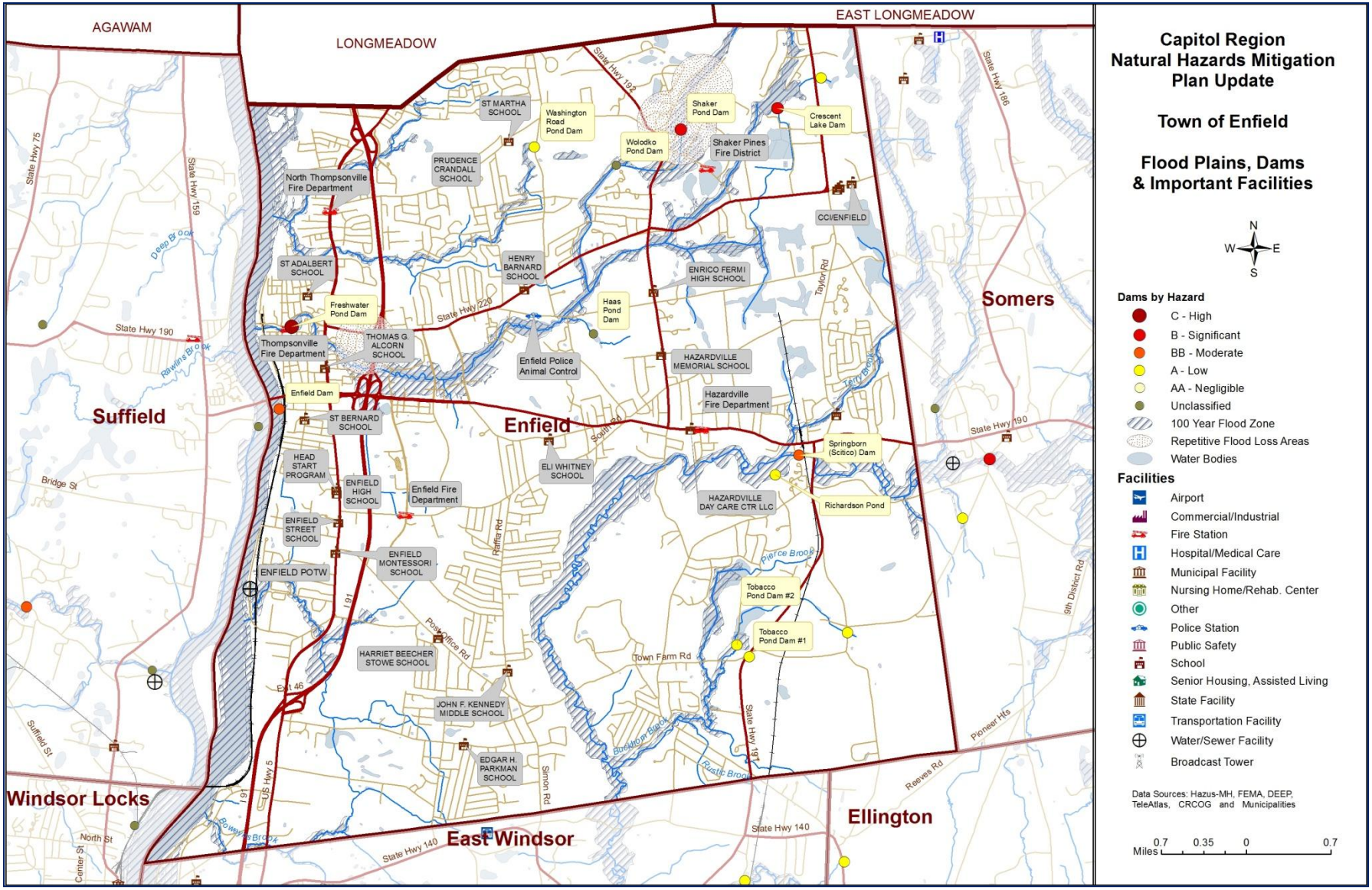
Potential Funding Sources: General Budget

Timeframe: Annually through budget process (2014-2019).

Map 28: Enfield Population Density, Dams and Flood Zones



Map 29: Enfield Flood Plains, Repetitive Loss Areas, Dams and Important Facilities



Farmington

Farmington is located in the southwest corner of the Capitol Region. It has a land area of 28.1 square miles and a population of approximately 25,000. Farmington's elevation is between 160-245 feet. The majority of Farmington's land area is located in the Farmington River watershed, but the eastern portion of Town is within the Park River Watershed. The main watercourses in Town include the Farmington and Pequabuck Rivers and Great, Hyde and Scott Swamp Brooks. Several major transportation routes traverse Farmington, including Interstate 84, and routes 4, 6, 9 and 10. The University of Connecticut's John Dempsey Hospital and medical and dental schools are located in Farmington. Principal industries located in town include numerous national and international corporate facilities, banking, insurance, retail (West Farms Mall), biomedical research and product development, aerospace engineering and products, laser research and production, precision and specialty manufacturing, manufacture of ball bearing spindles, springs, flow and level switches, fans, metals and plastics.

Challenges

Farmington's transportation network is frequently disrupted by flooding because of the Farmington River and its tributaries. The traffic impacts of road closures in and around Farmington are compounded by the limited number of river (Farmington and Pequabuck) crossings.

During the 2011 Hurricane Irene flooding event, the main roads leading to the Town's emergency shelter became flooded and inaccessible. There is a significant gap in our ability to provide a shelter during flooding events. Currently there are no other schools equipped with generator backup power.

Farmington's Emergency Operations Center is located in the Police Department. The Police Department is also the PSAP for the Towns of Burlington and Farmington and is the communications center for all Police/Fire operations in Farmington and Fire operations in the Town of Burlington. The Police Department is located in the 100 year flood plain and almost flooded during the last storm. We have no alternate site to move the communications center.

The National Flood Insurance Program has paid 123 property damage claims in Farmington totaling $1,189,996 to-date. Farmington also has six properties that suffer repetitive flood loss. The NFIP has paid out claims totaling over $797,564 in twenty Repetitive Loss Property claims on these properties to-date. Due to the low lying area of these houses and the disinterest of sale by the homeowners, we are left with mitigation in the form of early warning. The Town plans to utilize the Reverse 911 communications system along with the proposed hydrologic study of the Farmington River in order to warn these property owners of potential flooding incidences based upon rainfall predictions. This will allow for the early mitigation and evacuation of affected properties, thereby reducing the potential for loss of life and mitigating the loss of property. The Town has not permitted any recent new construction in the floodplain.

A significant flood event could result in substantial damage beyond those which have experienced repetitive losses. CRCOG used FEMA's Hazus-MH model to analyze the risks that the Town of Farmington might face from a major flood. The model estimates that economic losses to the town

including residential and commercial damage and business interruptions due to a flood having a 1% chance of occurring any given year (the 100-year flood) would be nearly $230 million. The impacts of such a flood are summarized below:

Estimated Damages from 100-Year Flood	Households Displaced	748
	People Needing Shelter	1,992
	Buildings at Least Moderately Damaged	393
	Total Estimated Economic Losses	$228,470,000
	Total Residential Building & Content Losses	$92,150,000
	Total Commercial, Industrial & Other Building & Content Losses	$135,120,000
	Total Business Interruption Losses	$1,200,000

CRCOG also used FEMA's Hazus-MH model to analyze the risks that the Town of Farmington might face from a hurricane as powerful as the 1938 hurricane. The model estimates that economic losses to the town including residential and commercial damage and business interruptions due to such a Category 3 hurricane would be nearly $100 million. The model also estimates that the probability of the UConn Health Center suffering at least moderate damage is over 50%. The impacts of such a storm are summarized below:

Estimated Damages from a 1938 Strength Hurricane	Households Displaced	41
	People Needing Shelter	6
	Buildings at Least Moderately Damaged	667
	Buildings Completely Damaged	27
	Total Estimated Economic Losses	$99,840,000
	Total Residential Building Losses	$67,080,000
	Total Commercial, Industrial & Other Building Losses	$21,020,000
	Total Business Interruption Losses	$11,740,000
	Total Debris Generated	39,248 tons
	Truckloads (at 25 tons/truck) of building debris	374

According to information from the Connecticut Department of Emergency Management and Homeland Security, the three federally declared natural disasters of 2011 resulted in total expenses to the municipality and other local agencies of over $2.6 million. These expenses include debris and snow removal, emergency protective measures and repairs to damaged infrastructure and buildings but do not include damages experienced by private citizens and businesses.

2011 Disasters Damage Amounts Eligible for 75% Reimbursement Under FEMA Public Assistance Program				
Applicant Town & Other (Other = Fire Districts, Schools, Private Non-Profit Agencies)	**100% of Amount Eligible for 75% Reimbursement**			**Total Damages Eligible for Public Assistance Due to 2011 Disasters**
	DR-1958-CT 2011 Snow	**DR-4023-CT Irene August 2011**	**DR-4046-CT Severe Weather Oct 2011 Alfred)**	
Town of Farmington	$73,307.82	$144,255.66	$2,371,538.19	$2,589,101.67
Farmington Other	$9,508.58		$58,644.34	$68,152.92
Farmington Total	**$82,816.40**	**$144,255.66**	**$2,430,182.53**	**$2,657,254.59**

GOAL: REDUCE TRAFFIC CONGESTION DUE TO FLOODING OF MAJOR EAST/WEST ROUTE (MEADOW ROAD)

Objective 1:
Implement traffic study to improve access to alternate routes (Town Strategic Plan).

Strategic Action:

1.1 Consider the feasibility of a fourth bridge over the Farmington River.
Because this is expected to be a long term, multi-year project, for the 2014-2019 Plan period, the action to be taken is to develop a scope of work for a feasibility study.
Lead: Planning, Engineering, Public Works
Priority: Medium
Status: Deferred: A fourth bridge was considered during the 2008/2009 Unionville Traffic Subcommittee. Two potential locations were identified; however currently there is a lack of funding to pursue the project.
Potential Funding Source: Grants, bonds
Timeframe: 2015-2019

Objective 2:
Consider the elevation of Meadow Road to reduce incidents of flooding.

Strategic Action:

2.1 Conduct an engineering and feasibility study of elevating Meadow Road and installing culverts to allow flow in both directions.
Because this is expected to be a long term, multi-year project, for the 2014-2019 Plan period, the action to be taken is to develop a scope of work and Request for Proposal (RFP) for the study.
Lead: Public Works, Engineering
Priority: Medium
Status: Deferred while funding is investigated.
Potential Funding Source: Grants, bonds
Timeframe: 2015-2019

GOAL: MINIMIZE LOSS OF LIFE AND PROPERTY AS A RESULT OF SEVERE STORMS

Objective 1:
Reduce the impacts of flooding.

Strategic Actions:

1.1 Improve communications with the Army Corps of Engineers to obtain advance warning of releases from the Goodwin Dam.
Lead: Emergency Management, Public Works
Priority: High
Status: Town staff has worked consistently and on a regular basis with the MDC on river flow conditions including storm events. Town staff will continue to work with MDC and ACOE throughout the 2014 – 2019 plan period to obtain information on river flow conditions.
Potential Funding Source: General funds
Timeframe: 2014-2019

1.2 Consider partnering with neighboring watershed communities to conduct a hydrologic study of the Farmington River.
Lead: Planning, Engineering
Priority: Medium
Status: Some discussions have taken place to date. Over the next five years, town staff will continue to investigate means undertake a hydrologic study of the river.
Potential Funding Source: General funds, grants
Timeframe: 2014-2019

1.3 Consider performing a town-wide hydrologic study.
Lead: Planning, Engineering
Priority: High
Status: The study is listed as a recommendation from the Storm Irene After-Action Report but has not been funded to date. The town has identified a hydraulic watershed study in its capital improvements program for 2015-2016.
Potential Funding Source: General fund
Timeframe: 2015-2016.

Objective 2:
Enhance the capabilities of the main town shelter (High School).

Strategic Action:

2.1 Continue to work with the Capitol Region Emergency Planning Committee on obtaining generators and other supplies.
Lead: Emergency Management
Priority: Low
Status: Completed: A generator and other improvements to the high school were installed.

Objective 3:
Enhance the capabilities of emergency responders to prepare and respond to severe weather.

Objective 4:
Improve the information flow to the public regarding pre-disaster planning.

Strategic Action:

4.1 Continue to use the town newsletter and website to release relevant information.
Lead: Emergency Management, Administration
Priority: High
Status: Notifications were made a number of times over the past five years. Over the next five years, town staff will continue to provide updated information.
Potential Funding Source: General funds
Timeframe: 2014-2019: updates to be posted seasonally and before major storm events.

THE FOLLOWING ADDITIONAL OBJECTIVES AND MITIGATION STRATEGIES ARE PROPOSED TO BE INCLUDED IN THE 2014 – 2019 PLAN UPDATE:

Objective 5:
Locate and equip an alternate site to be used as a Town shelter.

Strategic Action:

5.1 Equip Irving A. Robbins School as a shelter.
The current shelter becomes inaccessible during flooding events. The Town plans to make Irving A. Robbins School our shelter. The school is also a medical backup shelter to the University of Connecticut Health Center.
Lead: Emergency Management, Administration
Priority: High
Status: Completion is expected in 2014 dependent upon availability of funding
Potential Funding Source: Town Funding and Hazard Mitigation Grant Program. The Town is seeking grant and bond funding to provide a generator to power the Irving A. Robbins Middle School as an additional shelter.
Timeframe: 2014-2015

Objective 6:
Develop plans and procedures in the event that the Police Department floods and requires evacuation.

Strategic Action:

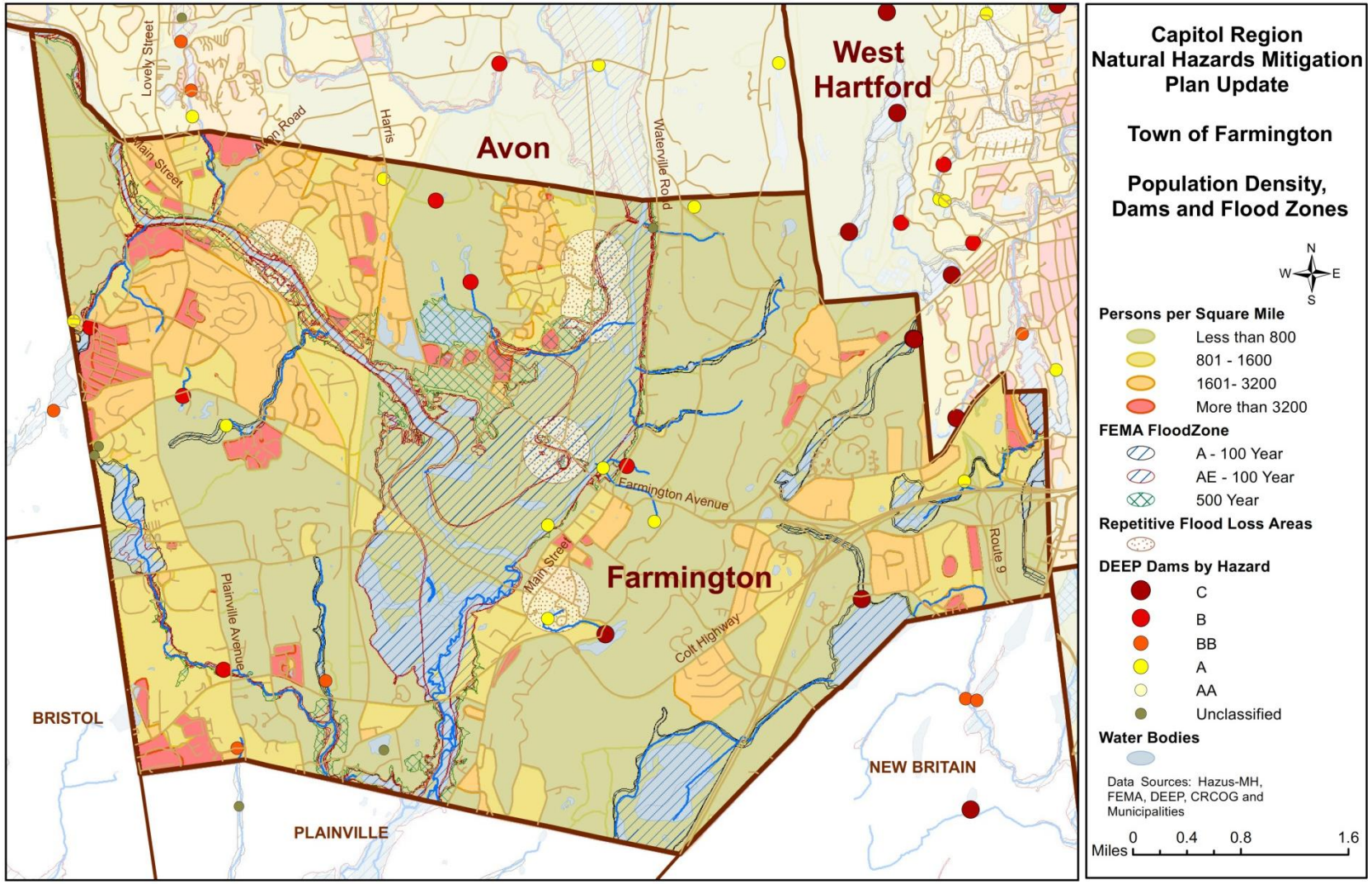
6.1 Establish the Farmington Fire Station as a backup dispatch center and EOC. The site needs to be equipped with phone lines and communications equipment.
Lead: Emergency Management
Priority: High
Status: Bond funding has been approved in this year's capital budget to equip a backup dispatch center and EOC
Potential Funding Source: bonds
Timeframe: Completion is expected in 2014

Objective 7:
Stabilize the Farmington River Embankment at the cemetery on Garden Street where the river turns north and has eroded during the last several flooding conditions. There are graves and a gravity sanitary sewer line that runs adjacent to the embankment.

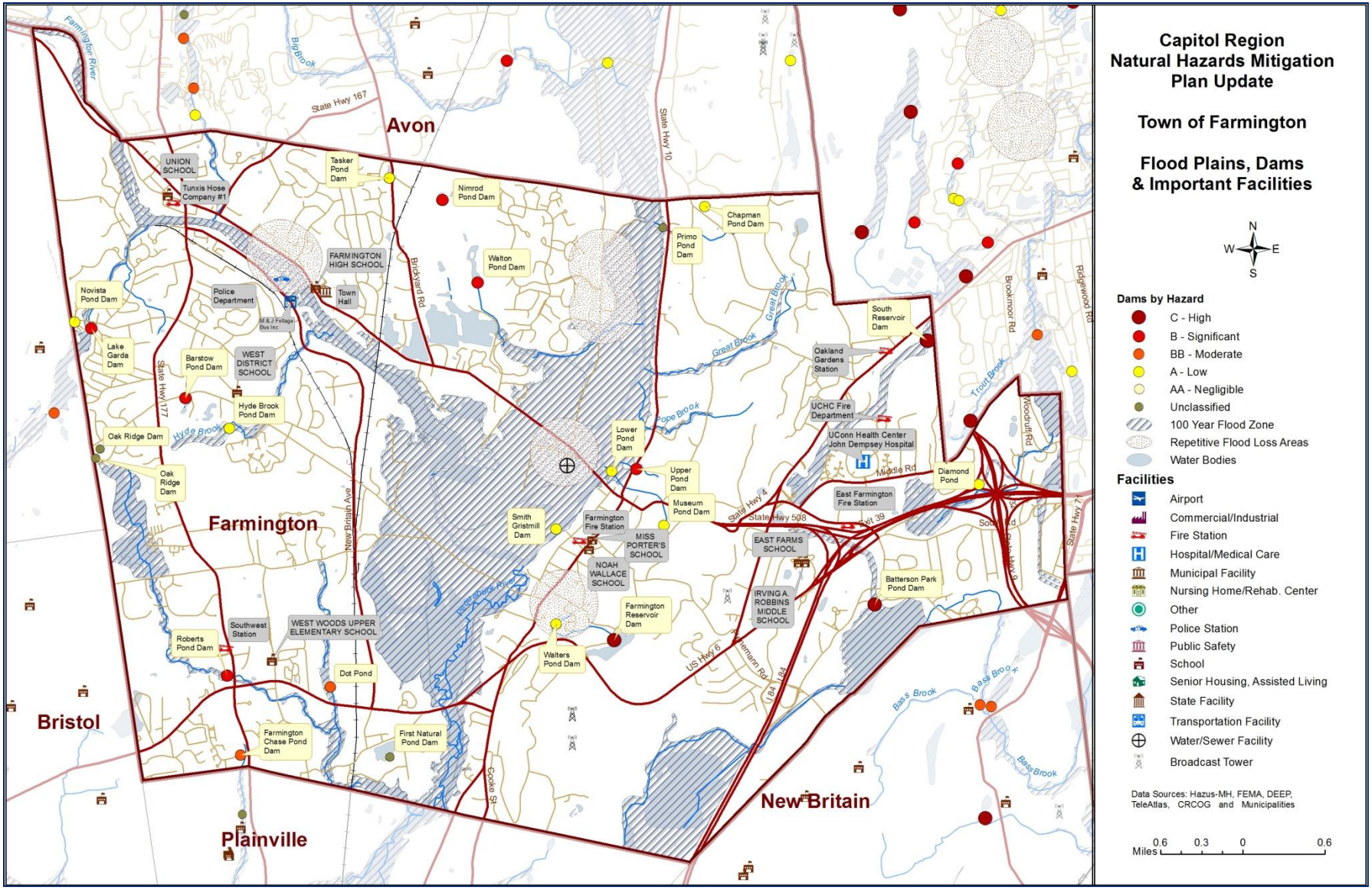
Strategic Action:

7.1 Design a permanent retaining wall system or structure such as steel sheet piling to prevent further erosion of the existing gravel embankment.
Lead: Public Works, Engineering
Priority: High
Status: Staff has met with CT DEMHS, Federal Agencies FEMA, and NRCS and has had dialogues with the USACE requesting assistance. Project will be undertaken as soon as funding is available to assist with the costs for the design and construction.
Potential Funding Source: Grant and limited Town General funds
Timeframe: 2014-2019

Map 30: Farmington Population Density, Dams and Flood Zones



Map 31: Farmington Flood Plains, Repetitive Loss Areas, Dams and Important Facilities



Glastonbury

The Town of Glastonbury encompasses 51.37 square miles with an estimated population of over 34,000 people. The elevation ranges from about 80 to 800 feet. The Town lies primarily in the Main Stem of the Connecticut River drainage basin while a small portion in the northeast corner of Glastonbury drains to the Hockanum Watershed. In addition to the Connecticut River which flows along the western boundary, main watercourses include Hubbard, Roaring, Salmon and Slab Gut Brooks. Major transportation routes through Glastonbury include Routes 2, 3, 17, 83 and 94. Glastonbury's major industries include insurance and financial services, technology and banking, computer services, medical and adult care facilities, agriculture, as well as retail.

Challenges

Glastonbury has experienced disruptions and damages due to flooding and severe storms. Ten percent of Glastonbury's land area is located in the 100-year floodplain, however, nearly 92% of this area is in the Flood Zone or otherwise zoned for resource protection /agriculture, recreation or public use. Five flood zone permits were approved between 2008 and 2014. All structures were flood-proofed and designed with flow-through standards and compensatory storage. The permitted structures included three accessory sheds or garages; a retail refrigeration addition in which the utilities were installed above the 500-year flood limit; and a municipal boathouse which was constructed with a 400 cubic yard increase in flood storage capacity. The Town also adopted enhanced Inland Wetlands and Watercourses Regulations in 2010 which could reduce its overall level of vulnerability.

Since 1978, the National Flood Insurance Program has paid 44 property damage claims in Glastonbury totaling $160,639. Glastonbury has not had any Repetitive Loss Property claims. Although development is generally restricted from the floodplain, a significant flood event could result in much damage. CRCOG used FEMA's Hazus-MH model to analyze the risks that the Town of Glastonbury might face from flooding. The model estimates that economic losses to the town including residential and commercial damage and business interruptions due to a flood having a 1% chance of occurring any given year (the 100-year flood) would be nearly $36 million. The impacts of such a flood are summarized below:

Estimated Damages from 100-Year Flood	Households Displaced	278
	People Needing Shelter	456
	Buildings at Least Moderately Damaged	10
	Total Estimated Economic Losses	$35,720,000
	Total Residential Building & Content Losses	$13,590,000
	Total Commercial, Industrial & Other Building & Content Losses	$22,010,000
	Total Business Interruption Losses	$120,000

CRCOG also used FEMA's Hazus-MH model to analyze the risks that the Town of Glastonbury might face from a hurricane as powerful as the 1938 hurricane. The model estimates that economic losses to the town including residential and commercial damage and business interruptions due to such a Category 3 hurricane would be over $210 million. The impacts of such a storm are summarized below:

Estimated Damages	Households Displaced	191
	People Needing Shelter	40

from a 1938 Strength Hurricane	Buildings at Least Moderately Damaged	1,342
	Buildings Completely Damaged	78
	Total Estimated Economic Losses	$210,906,000
	Total Residential Building Losses	$144,360,000
	Total Commercial, Industrial & Other Building & Content Losses	$42,373,000
	Total Business Interruption Losses	$24,173,000
	Total Debris Generated	90,099 tons
	Truckloads (at 25 tons/truck) of building debris	724

The Town's experience during Storm Alfred indicates that the Hazus-MH model may underestimate local sheltering requirements.

According to information from the Connecticut Department of Emergency Management and Homeland Security, the three federally declared natural disasters of 2011 resulted in total expenses to Glastonbury and other local agencies of over $3.2 million. These expenses include debris and snow removal, emergency protective measures and repairs to damaged infrastructure and buildings but do not include damages experienced by private citizens and businesses.

2011 Disasters Damage Amounts Eligible for 75% Reimbursement Under FEMA Public Assistance Program				
Applicant: Town & Other Agencies (Fire Districts, Schools, and Private Non-Profit Agencies)	**100% of Amount Eligible for 75% Reimbursement**			**Total Damages Eligible for Public Assistance Due to 2011 Disasters**
	DR-1958-CT 2011 Snow	**DR-4023-CT Irene - August 2011**	**DR-4046-CT Severe Weather Oct 2011 (Alfred)**	
Town of Glastonbury	$151,750.38	$143,264.05	$2,912,150.36	$3,207,164.79
Glastonbury Other	$4,192.05		$61,468.77	$65,660.82
Glastonbury Total	**$155,942.43**	**$143,264.05**	**$2,973,619.13**	**$3,272,825.61**

Goals, Objectives and Strategies

While the Town of Glastonbury's 2008 Plan created two separate goals to reduce losses due to either winter storms and or hurricanes, the 2014-2019 Plan will address one single goal for any type of natural disaster. The plan will restate some previously identified objectives and strategies from the 2008 plan, as well as address new initiatives which will be undertaken during the 2014-2019 planning period. The overall reaching goal for the Town of Glastonbury will be to reduce loss of life, property and the economic consequences from a natural disaster.

GOAL: REDUCE LOSS OF LIFE, PROPERTY AND ECONOMIC CONSEQUENCES FROM NATURAL DISASTERS SUCH AS WINTER STORMS, HURRICANES AND FLOODING.

Objective 1:
Improve ability to clear roadways as a result of storm events, which may be impassable due to snow, flooding or debris in order to improve emergency access and to assist in expediting utility restoration as required.

Strategic Actions:

1.1 Secure contractual tree removal services and equipment prior to storm response and cleanup.
Lead: Parks
Priority: High
Status: This is a new initiative supported by goals and priorities identified in the Town's 2013/2014 budget.
Potential Funding Source: General fund
Timeframe: 2014-2019

1.2 Procure additional Town equipment to expedite cleanup operations as a result of storm events which include large scale snow blowing/removal and debris collection equipment.

Lead: Physical Services
Priority: Medium
Status: This is a new initiative
Potential Funding Source: General Fund
Timeframe: 2014-2019: Annually during the budget process.

Objective 2:
Expand the Town's tree maintenance program for tree trimming located within public right of ways to mitigate the delay in the restoration process of utilities, such as electricity, natural gas and public water service.

Strategic Actions:

2.1 Increase the Town budget for the trimming and removal of potentially hazardous trees.
Lead: Parks, Administration
Priority: Medium
Status: This is a new initiative supported by goals and priorities identified in the Town's 2013/2014 budget.
Potential Funding Source: General fund
Timeframe: 2014-2019: To be reevaluated annually during the budget process.

Objective 3:
Improve Town's ability to provide emergency shelter for residents and small pets.

Strategic Actions:

3.1 Increase inventory of emergency response supplies and acquire storage for same (food, water, cots, oxygen cylinders, signs, electronic devices (charging stations) etc.)
Lead: Emergency Management, Social Services, Administration
Priority: High
Status: This is a new initiative.
Potential Funding Source: General fund
Timeframe: 2015-2016: Annually during the budget process.

Objective 4:
Continue to enhance capabilities to track high risk population and provide emergency notification systems to reach isolated/special needs population.

Strategic Actions:

4.1 Continue voluntary registry and classifications of those individuals who may require special assistance in an emergency.
Lead: Health
Priority: High
Status: The registry has been established and is periodically updated. It is anticipated that an annual review will be conducted.
Potential Funding Source: General fund
Timeframe: 2014 – 2019

4.2 Develop and implement messaging system to provide early alert system to isolated and high risk population utilizing Everbridge (reverse 911), Board of Education notification system and social media.
Lead: Public Safety/Health
Priority: High
Status: This is a revised initiative for the Plan Update. In the 2008 Plan, the Town proposed to ensure operation of Reverse 911 as a means of establishing capability to develop and track high risk populations. The Public Safety Department currently utilizes a reverse 911 system.
Potential Funding Source: General fund
Timeframe: Expected to be completed by the end of FY 2013-2014

Objective 5:
Enhance public information efforts and promote public education for residents and businesses of Glastonbury as to how to prepare for a natural disaster and the necessary precautions that should be taken to protect their assets during an extended power outage.

Strategic Action:

5.1 Develop materials instructing residents on measures to take care of their own properties (bleeding water lines etc.), and services offered by the Town. Post information on town website, social media and produce for distribution in welcome packets, with tax mailings and through other periodic offerings. Create checklist for public to utilize during emergencies.
Lead: Emergency Management, Administration
Priority: Medium
Status: The town has developed and distributed promotional materials to residents through its website, mailings and at community events. Updates, website postings and distribution of materials will continue periodically.
Potential funding Source: General fund
Timeframe: 2014-2019

5.2 Identify and purchase generator/battery powered messaging signs to provide important safety emergency information to public during times of extended power outages.
Lead: Emergency Management
Priority: Medium
Status: This is a new initiative.
Potential Funding Source: General Fund
Timeframe: 2014-2016

Objective 6:
Establish state of the art Emergency Operations Center (EOC) with secondary and backup EOC for redundancy.

Strategic Action:

6.1 Relocated EOC to Academy Building from Police Training Room to improve overall operational efficiencies. Police Training Room will be utilized as backup EOC. Identify and purchase supplemental equipment/enhancements to operate effectively (GIS software for accessing/monitoring damage reports, technology, phone/alert systems, storage). In addition to the primary and secondary EOC locations an additional contingency to utilize Fire Company #3 and #4 may be required based on specific extenuating needs.
Lead: Administration
Priority: High
Status: Academy Building serves as EOC. Enhancements, equipment to be procured.
Potential Funding Source: General Fund
Timeframe: Expected to be completed by the end of FY 2014-2015

Objective 7:
Enhance overall functionality of Town operations and specified business community during extended power outages.

Strategic Actions:

7.1 Installation of a new emergency generator at the Community Center as this facility can be utilized as an emergency shelter. In addition to providing emergency power to the compressed natural gas filing station located at the Community Center which provides fuel for vehicles within the Town fleet.
Lead: Facilities, Administration
Priority: High
Status: New initiative
Potential Funding Source: General Fund
Timeframe: 2013-2015

7.2 Purchase mobile generators to be utilized as primary and backup power sources for Town operations.
Lead: Facilities, Administration
Priority: High

Status: New initiative
Potential Funding Source: General Fund
Timeframe: 2013-2015.

7.3 Replace inoperable generator at Town Hall/Academy complex.
Lead: Facilities, Administration
Priority: High
Status: New initiative
Potential Funding Source: General Fund
Timeframe: 2013-2015

7.4 Replace inadequate generators at Police, Highway and Parks Maintenance Facility.
Lead: Facilities, Administration
Priority: High
Status: New initiative
Potential Funding Source: General Fund
Timeframe: 2013-2015

7.5 Review feasibility of micro-grid system(s) within the Town Center area to supplement Town Facilities as well as specific business community operations such as gas stations and grocery stores. This system could be utilized in the event of an extended power outage.
Lead: Facilities, Administration
Priority: High
Status: New initiative
Potential Funding Source: General Fund
Timeframe: 2013-2015

Objective 8:
Maintain strict control of development to and near flood prone areas.

Strategic Action:
8.1 Continue to implement and enforce regulations.
Lead: Planning, Engineering, Building
Priority: High
Status: This is an established practice and routine effort of the Town. The Community Development Department administers a development review process and enforces regulations which ensure that development conforms to floodplain, inland wetlands and erosion and sedimentation control as well as zoning regulations and building codes. Efforts will continue throughout the planning period.
Potential Funding Source: General Fund
Timeframe: 2014 – 2019

Objective 9:
Improve public safety's capabilities to reach isolated population.

Strategic Actions:

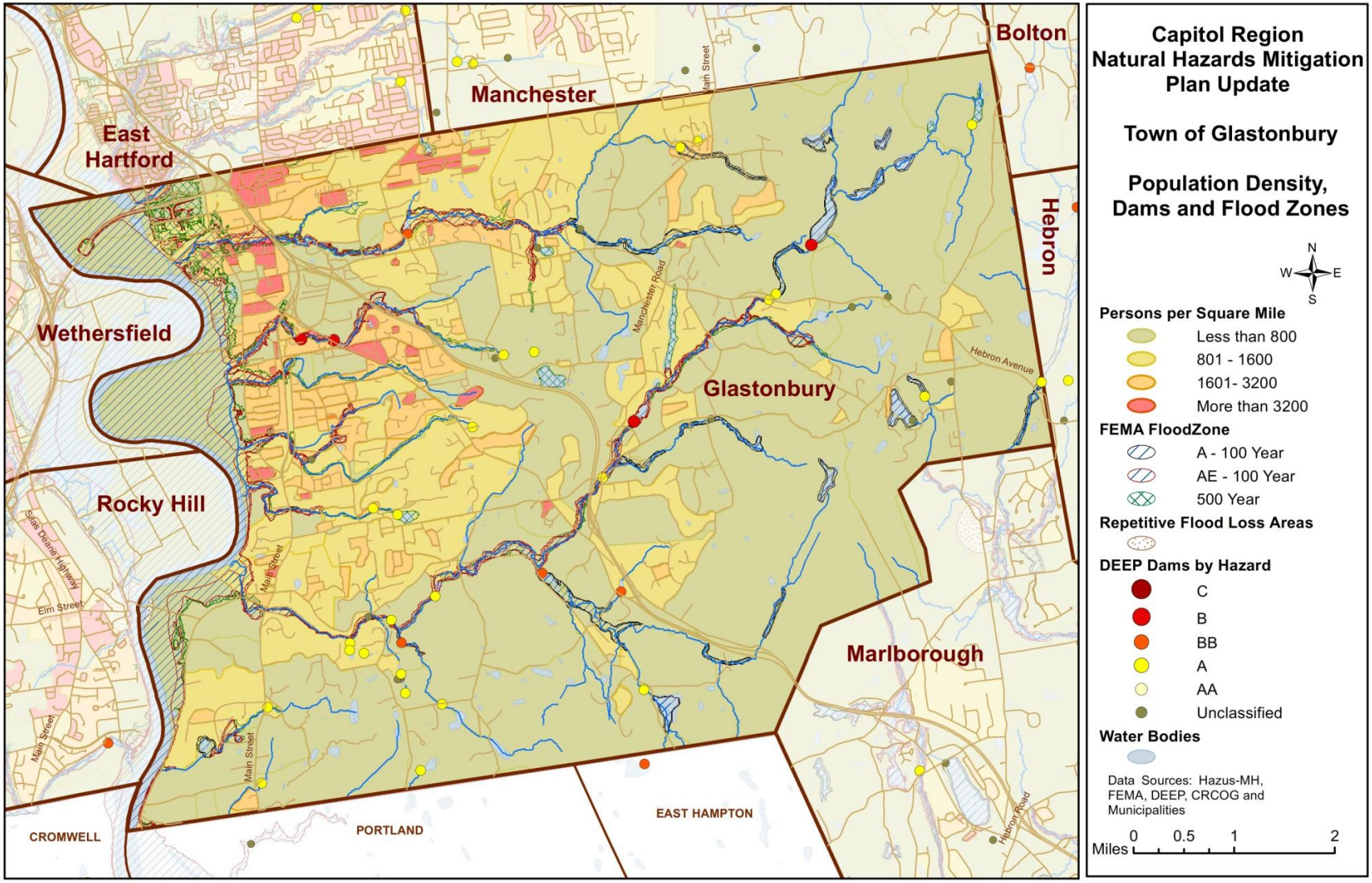
9.1 Consider drainage improvements to Shoddy Mill, Forest Lane and other areas of periodic flooding.
Lead: Public Works, Engineering
Priority: Low
Status: This is a new initiative.
Potential Funding: General Fund
Timeframe: 2015-2019

9.2 Consider purchasing additional watercraft for emergency rescue operations during flooding.
Lead: Fire
Priority Low
Status: New initiative. Equipment would supplement existing water rescue equipment.
Potential Funding: General Fund
Timeframe: 2015-2019

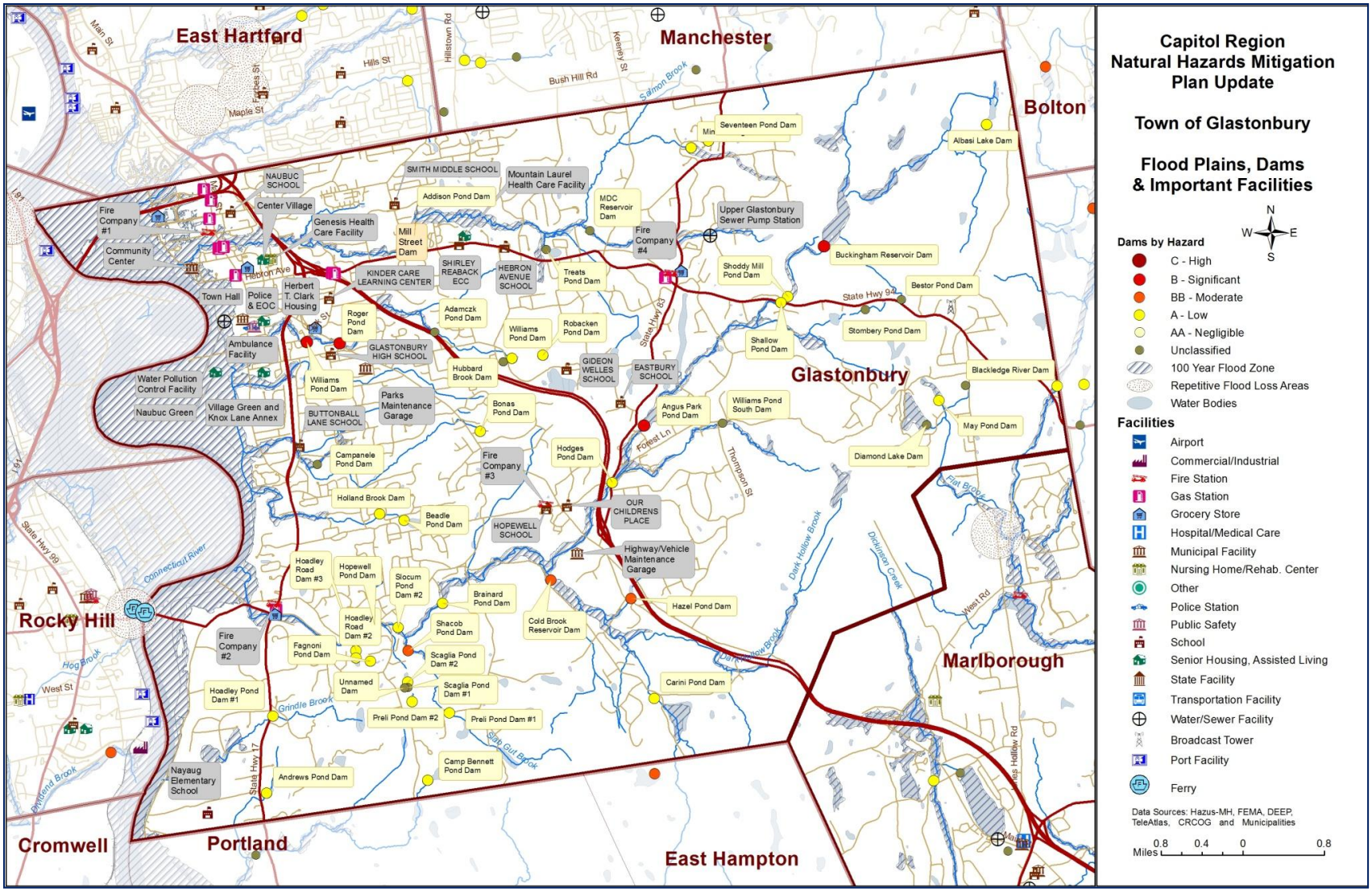
The following Strategic Action was included in the 2008 Plan but because of work accomplished, it is not proposed for inclusion in the 2014-2019 Plan Update:

Study the feasibility of elevating the Naubuc Avenue Bridge.
Lead: Physical Services, Engineering
Priority: Low
Status: Rehabilitation to this historic bridge was completed in 2012 to address structural deficiencies. The work included storm drainage updates and the provision of flood-compensation area. No changes in elevations were made and are not planned.

Map 32: Glastonbury Population Density, Dams and Flood Zones



Map 33: Glastonbury Flood Plains, Repetitive Loss Areas, Dams and Important Facilities



Granby

Granby is a rural, low density residential community located in northwest Hartford County on the Massachusetts border. It covers a land area of 40.7 square miles and has an estimated population of 11,300. Granby is not only large in area, but it has a substantial variation in elevation. The Town's many brooks serve as a drainage basin of the Farmington River. The main watercourses running through Granby include Beech, Bissell, Dismal, Higley, Hungary, Mountain and Salmon (East and West Branches) Brooks. Major transportation routes include state routes 10/202, 20, 189 and 219.

Since preparing the initial Natural Hazards Mitigation Plan in 2008, the Town has had unique opportunities to evaluate its ability to respond to natural hazards. These opportunities were presented in 2011 by Hurricane Irene, and by the 2011 Halloween nor'easter, sometimes referred to as Storm Alfred. To a lesser degree the Town was challenged by the 2008 Ice Storm which impacted homes within the higher elevations of the town. With the Ice Storm, the Department of Public Works was directed to re-open roads that were blocked by fallen trees and the Town's emergency shelter was activated to assist those without power. It is recognized that most residents in Granby who are without power will also be without water. This is true for all residents living at the higher elevations. Following the storm, the Town's YMCA was made available for residents to shower, and Town water was made available for residents to fill water containers. Within a few days the Town was mostly back to normal and it was felt that the Town could successfully respond to such an emergency. Connecticut Light and Power also responded quickly and effectively to this emergency.

With both Hurricane Irene and the Halloween Nor'easter, the Town's emergency response team was activated and helped to coordinate the necessary response. CERT was formed in 2010, following the guidelines of Homeland Security. Hurricane Irene presented initial problems mostly related to flooding. Many roads were closed as the flood waters rose, but were quickly re-opened as the water receded. Power outages were limited to a few individual property owners, as was basement flooding. The Town did not need to provide emergency shelter. The Emergency Response Team was satisfied with their ability to respond to Hurricane Irene, but felt that they could have charted the flooding and road closers more effectively if they had better maps. They requested large plastic coated maps to assist with the future coordination of road closers. These were created through the Town's GIS system and provided to every fire station along with multiple copies to the Police Department and CERT.

The Halloween Nor'easter hit the Town of Granby only two months after Hurricane Irene. With most of the trees still retaining their leaves and with the combination of high winds and heavy snow, trees broke apart throughout the town in all but the highest elevations. The trees took down power lines throughout the Town and the downed trees and power lines prevented the Town crews from plowing the roads. All over Town residents were trapped without power and emergency vehicles had little opportunity to reach them. The Town was fortunate that the weather quickly broke and was followed by somewhat warmer days and sunshine. However the electrical service was completely devastated throughout much of the region and CL&P was overwhelmed by the destruction. Restoring power was very slow and tedious. The Town opened its emergency shelter and quickly learned that it was not sufficient to service the large number of residents in need. Fortunately, as the roads were cleared, many residents were able to find accommodations outside of Town. CERT worked well with CL&P asking that they prioritize certain areas. A major electrical route of Route 10 was opened within 3 days, which solved some of the Town's most serious problems. The YMCA opened and made showers available to all area citizens. Town facilities, operating on generators help residents as best they could. Generators

were in short supply and needed to be moved in order to clear waste from the Town's sewer pump stations. Schools were closed for over a week.

Learning from the Halloween Nor'easter, the Town has added generators to all of its fire houses, the Senior Center and Schools. CERT is now working on a plan to utilize these buildings during future emergencies. The Town also has a better understanding of the areas which need to be prioritized during emergencies. These include the Meadowbrook Nursing Home and the water tanks and pumps that service the Salmon Brook Water District. Through the actions of the State, CL&P is also improving its plans to respond in future emergencies. It was reported that CL&P was not prepared for an event of this size and had planned for a worst-case scenario in which 100,000 customers lost power, only one-eighth of those who actually did.

Challenges

Granby's population is spread out over 40+ square miles resulting in a population density of only 284 persons per square mile. While some Granby citizens reside in areas of less than 200 feet above sea level, others live above 1000 feet. In Connecticut where winter weather often hovers around 32 degrees, even a slight decrease in temperature due to the increase in elevation will result in a snow/ice division. This is a common occurrence in Granby, where ice/snow conditions may be found in half of the town while simple rain falls in the remaining portion. Such was the case on 12/12/2008 when the town had significant road closures and power outages at elevations above 600 feet while residents in the lower areas wondered why school was being cancelled. Fortunately the Town has an excellent understanding of this and dispatches crews systematically to address each occurrence. While the steep terrain can be difficult to navigate during winter storms, the town crews are well trained and equipped to address such circumstances. New equipment and personnel are made available as necessary.

The Town contains significant forested lands, including state forest and the privately held properties of the McLean Game Refuge and Granby Land Trust, and therefore has more concern over forest fires than most other towns in the region. The Lost Acres Fire Department has an excellent understanding of forests fires and is well equip to address the situation should it arise. The LAFD regularly updates its equipment as needed. New electrical generators were recently installed in all the fire houses.

A small portion of the Town is within the 100 year flood zone and very little development has occurred or is allowed to occur within the area. Therefore the Town has had relatively minor losses due to flooding. The National Flood Insurance Program has paid 17 property damage claims in Granby totaling nearly $99,000 to-date. The NFIP has paid out four Repetitive Loss Property claims on one property in Granby to-date. These claims have totaled over $23,000. Because of its steep terrain, when flooding does occur, the flood waters quickly recede following the storm. The Town has an excellent understanding of local flooding and is prepared to address areas of flooding for the short duration when the flood waters are present. In most cases this involves short term road closers. No new development is anticipated within the areas of potential flooding. Granby had no new construction or demolition since 2008 in floodplains or other vulnerable areas. The Town did a complete review and adopted modifications to Section 8.18 of the Zoning Regulation Special Flood Hazard Areas in September of 2008. These changes were adopted in accordance with recommendations of the Connecticut Department of Energy and Environmental Protection (DEEP). The changes are designed to decrease Granby's vulnerability to flooding.

Nonetheless, a significant flood event could result in much damage. CRCOG used FEMA's Hazus-MH model to analyze the risks that the Town of Granby might face from a major flood. The model estimates that economic losses to the town including residential and commercial damage and business interruptions due to a flood having a 1% chance of occurring in any given year (the 100-year flood) would be over $42 million. The impacts of such a flood are summarized below:

Estimated Damages from 100-Year Flood	Households Displaced	290
	People Needing Shelter	538
	Buildings at Least Moderately Damaged	66
	Total Estimated Economic Losses	$42,450,000
	Total Residential Building & Content Losses	$26,430,000
	Total Commercial, Industrial & Other Building & Content Losses	$15,940,000
	Total Business Interruption Losses	$90,000

CRCOG also used FEMA's Hazus-MH model to analyze the risks that the Town of Granby might face from a hurricane as powerful as the 1938 hurricane. The model estimates that economic losses to the town including residential and commercial damage and business interruptions due to such a Category 3 hurricane would be over $86 million. The impacts of such a storm are summarized below:

Estimated Damages from a 1938 Strength Hurricane	Households Displaced	0
	People Needing Shelter	0
	Buildings at Least Moderately Damaged	200
	Buildings Completely Damaged	9
	Total Estimated Economic Losses	$29,947,000
	Total Residential Building Losses	$26,053,000
	Total Commercial, Industrial & Other Building Losses	$1,783,000
	Total Business Interruption Losses	$2,111,000
	Total Debris Generated	39,975 tons
	Truckloads (at 25 tons/truck) of building debris	93

Hurricane Irene, which occurred in August of 2011, provided an opportunity for the Town to test its preparation for such major events. Early on the Emergency Management team was activated. Many roads were flooded during the height of the storm and the Town quickly closed such roads and re-routed traffic. As expected the floodwaters quickly receded after the storm and the Town returned to normal. The October 2011 snowstorm, proved a much greater problem. Again the emergency management team was called into operation. However, the heavy snowfall and resulting tree and power line damage completely crippled the Town. The power outages were extensive and prolonged. The Town's emergency shelter proved to be a great help in accommodating those without power, but also proved inadequate. In response to these events the Town has added generations to most of its public building and plans are being considered as to the future use of these building during prolonged emergencies.

According to information from the Connecticut Department of Emergency Management and Homeland Security, the three federally declared natural disasters of 2011 resulted in total expenses to the municipality of over $2 million. These expenses include debris and snow removal, emergency

protective measures and repairs to damaged infrastructure and buildings but do not include damages experienced by private citizens and businesses.

2011 Disasters Damage Amounts Eligible for 75% Reimbursement Under FEMA Public Assistance Program				
Applicant: Town	100% of Amount Eligible for 75% Reimbursement			Total Damages Eligible for Public Assistance Due to 2011 Disasters
	DR-1958-CT 2011 Snow	DR-4023-CT Irene August 2011	DR-4046-CT Severe Weather Oct 2011: Alfred	
Town of Granby	**$39,537.37**	**$84,643.21**	**$1,925,977.58**	**$2,050,158.16**

The Town is completely dependent on ground water for its potable water supply. Most homes in Granby have individual wells, most of which are bedrock wells, though gravel pack or point wells are not uncommon. The Town has no history of droughts seriously impacting local wells, though shallow wells can be temporarily impacted. However, wells cannot operate without electricity. Therefore prolonged electrical outages will result in potable water and sewage disposal issues. Granby is serviced by two water companies, the Salmon Brook Water District and the Aquarian Water Company. Both of these companies are supplied by well water. The Aquarian Water Company is located in Simsbury, where its wells are all located. The Salmon Brook Water District has a 190,000 gallon water tank off of Pendleton Road, with wells located near the Town's Salmon Brook Park. There is no history of concerns in regards to the quantity of the water supply. The Town works cooperatively with the Salmon Brook Water District in regards to maintaining the quality of the water. Plans are currently underway for the construction of a second water tank to service the District.

Goals, Objectives and Strategies

GOAL: REDUCE PROPERTY DAMAGE DUE TO UNSAFE CONDITIONS RESULTING FROM WINTER STORMS

Objective 1:
Improve snow removal equipment and techniques.

Strategic Actions:

1.1 Pursue increased funding for equipment and labor as necessary.
Lead: Public Works, Administration
Priority: Medium
Status: The Town has purchased new and improved snow removal equipment since 2008. It is recommended that this mitigation action be continued in the 2014-2019 Plan Update.
Potential Funding Source: local funds
Timeframe: 2014-2019: Annually during the budget process.

1.2 Continue to pursue opportunities for service and equipment sharing with neighboring communities through CRCOG's service sharing initiative and otherwise.
Lead: Public Works, Administration

Priority: Medium
Status: Although there has not been an opportunity for service and equipment sharing specific to snow removal, Granby has participated in a number of service sharing opportunities in the past and will continue to pursue opportunities to support snow removal.
Potential Funding Source: grants and local funds
Timeframe: 2014 – 2019

1.3 Improve Public Works personnel contracts to ensure adequate staffing for storm situations.
Lead: Administration
Priority: Medium
Status: Contracts have been revised and the Town feels that, absent unforeseen circumstances staffing is adequate for most storms.

Objective 2:
Remove and prevent impediments to snow removal operations.

Strategic Actions:

2.1 Educate private snow-removal contractors and residents on not obstructing roads and the right-of-way.
Lead: Police and Fire
Priority: Medium
Status: Continuing efforts have been made. Efforts will continue and outreach will be conducted periodically.
Potential Funding Source: local funds
Timeframe: 2014-2019

2.2 Enforce existing ordinance prohibiting roadway obstructions.
Lead: Police
Priority: Medium
Status: Continuing efforts have been made. Efforts will continue and enforcement will be conducted as needed.
Potential Funding Source: local funds
Timeframe: 2014-2019

Objective 3:
Educate public on hazardous conditions during storm events - promote safe driving techniques.

Strategic Actions:

3.1 Continue to issue press releases and advisories.
Lead: Emergency Management, Police
Priority: High

Status: The Town is now actively using the Everbridge Aware emergency notification system. This reverse notification system enables the Town to notify its citizens through every communication device—including mobile phones, landlines, smart phones, email, text messaging, instant messaging, pagers, and more based on their preferences and stops sending messages after a recipient confirms receipt. Outreach will continue to be conducted periodically.
Potential Funding Source: local funds
Timeframe: 2014-2019

GOAL: IMPLEMENT GUIDELINES AND REGULATIONS TO REDUCE EXPOSURE TO PROPERTY DAMAGE AND LOSS OF LIFE AS A RESULT OF FLOODING

Objective 1:
Restrict development of buffer areas in flood prone zones and promote best development practices for minimizing environmental impacts.

Strategic Actions:

1.1 Continue to work with FEMA and DEEP to maintain zoning, subdivision and wetlands regulations current with best practices.
Lead: Community Development
Priority: High
Status: In September of 2008, the Town updated its Flood Hazard Regulation in accordance with recommendations of the State DEEP and FEMA. Town regulations will continue to be evaluated periodically and updated as necessary.
Potential Funding Source: local funds
Timeframe: 2014-2019

1.2 Update the stormwater management plan as necessary.
Lead: Engineering, Planning
Priority: Medium
Status: In the 2008 Plan, the Town proposed to complete and implement a Stormwater Management Plan. A comprehensive Stormwater Management Plan was revised and adopted in April of 2008. The Plan will be evaluated periodically and updated as necessary.
Potential Funding Source: local funds
Timeframe: 2014-2019

1.3 Investigate participation in the National Flood Insurance Program's Community Rating System.
Lead: Planning, Administration, Emergency Management
Priority: Medium
Status: This is a new initiative.
Potential Funding Source: local funds
Timeframe: 2014-2019

Objective 2:
Maintain waterways, drainage and other structures in critical flood areas.

Strategic Actions:

2.1 Address priority bridges, culverts and other drainage projects as may be identified in Capital Improvement Plan.
Lead: Public Works, Engineering, Administration
Priority: High
Status: As of December, 2012 the Town was in the final stages of a complete reconstruction of the Silver Street Bridge. Over the past 5 years numerous drainage projects have been completed, mostly in conjunction with road reconstruction projects. The Town continues such concerns.
Potential Funding Source: local funds, bonding, and/or grants
Timeframe: 2014-2019: Annual evaluation of improvement projects will be undertaken during the budget process.

2.2 Work with DEEP to continue to monitor dams as necessary.
Lead: Engineering, Emergency Management
Priority: Medium
Status: This is an established practice; periodic monitoring of dams with DEEP will continue.
Potential Funding Source: local funds
Timeframe: 2014-2019

Objective 3:
Ensure traffic safety during flood events.

Strategic Actions:

3.1 Regularly update the communication protocols with neighboring communities on road closures and detour routing.
Lead: Police, Fire
Priority: High
Status: The Town has worked to improve communications with neighboring towns and this will remain a continuing effort. Updates will be made periodically.
Potential Funding Source: local funds
Timeframe: 2014-2019

3.2 Educate police personnel on detour routing protocols to ensure alternative routes can accommodate trucks.
Lead: Police
Priority: Medium
Status: Continuing. Training will continue to be conducted periodically.
Potential Funding Source: local funds
Timeframe: 2014-2019

3.3 Use GIS technology in coordinating and prioritizing response.

Lead: Police, Fire Community Development

Priority: Medium

Status: New, large size maps, with updated information were recently produced and made available to first responders. GIS technology is available and has been provided to the Public Works and Police Departments. Education on its use continues.

Potential Funding Source: local funds

Timeframe: 2014-2019

GOAL: REDUCE PERSONAL PROPERTY DAMAGE AND POWER FAILURES CAUSED BY HIGH WINDS

Objective 1:

Aggressively work with utility companies to identify high risk areas and promote tree trimming.

Status: Tree trimming is ongoing and aggressive.

Objective 2:

Relocate high density utility facilities underground.

Strategic Actions:

2.1 Create a long range plan for placing utility facilities underground.

Lead: Planning, Emergency Management

Priority: Low

Status: Efforts have been initiated and the town will continue to work with the utilities to develop an appropriate plan.

Potential Funding Source: local funds

Timeframe: 2014-2019

2.2 Pursue opportunities to relocate wires where they are vulnerable: areas of repetitive power failure.

Lead: Emergency Management, Planning

Priority: Medium

Status: Efforts have been initiated and the town will continue to work with the utilities and property owners to encourage relocation of vulnerable wires as opportunities arise.

Potential Funding Source: local funds

Timeframe: 2014-2019

Objective 3:

Promote an ongoing tree maintenance program along public rights-of-way.

Strategic Actions:

3.1 Seek to increase local budget for tree trimming.
Lead: Public Works, Administration
Priority: Medium
Status: Since the storms of 2011 the DPW has been actively involved in tree trimming.
Potential Funding Source: local funds
Timeframe: 2014-2019: Annual evaluation of the tree trimming budget will be undertaken during the budget process.

GOAL: REDUCE PERSONAL PROPERTY DAMAGE AND LOSS OF LIFE RESULTING FROM FOREST FIRES

Objective 1:
Promote forest management to reduce fire risks.

Strategic Actions:

1.1 Develop and implement timber management program for town-owned property.
Lead: Public Works, Parks
Priority: Medium
Status: The Lead department heads will meet with local foresters to discuss the development and implementation of a timber management plan. Separate plans may be necessary for individual properties. Prior to any adoption, draft plans will be subject to a public review process.
Potential Funding Source: local funds, grants
Timeframe: 2015

1.2 Promote timber management planning with other major landholders including McLean Game Refuge, Granby Land Trust and the State.
Lead: Public Works, Parks
Priority: Medium
Status: Deferred. It is recommended that this project will continue to be considered in next plan period. Outreach will be conducted periodically.
Potential Funding Source: local funds (for outreach)
Timeframe: 2014-2019

Objective 2:
Determine and implement best practices to facilitate forest-fire fighting.

Strategic Actions:

2.1 Promote and implement best practices, such as fire roads, dry hydrants, etc.

Lead: Community Development, Engineering

Priority: Medium

Status: The Office of Community Development has established an important working relationship with the Lost Acres Fire Department for the review of proposed developments. This will be a continual effort and will be conducted as development proposals are reviewed.

Potential Funding Source: local funds

Timeframe: 2014-2019

2.2 Consider regulations requiring dry hydrant installations in new developments.

Lead: Community Development

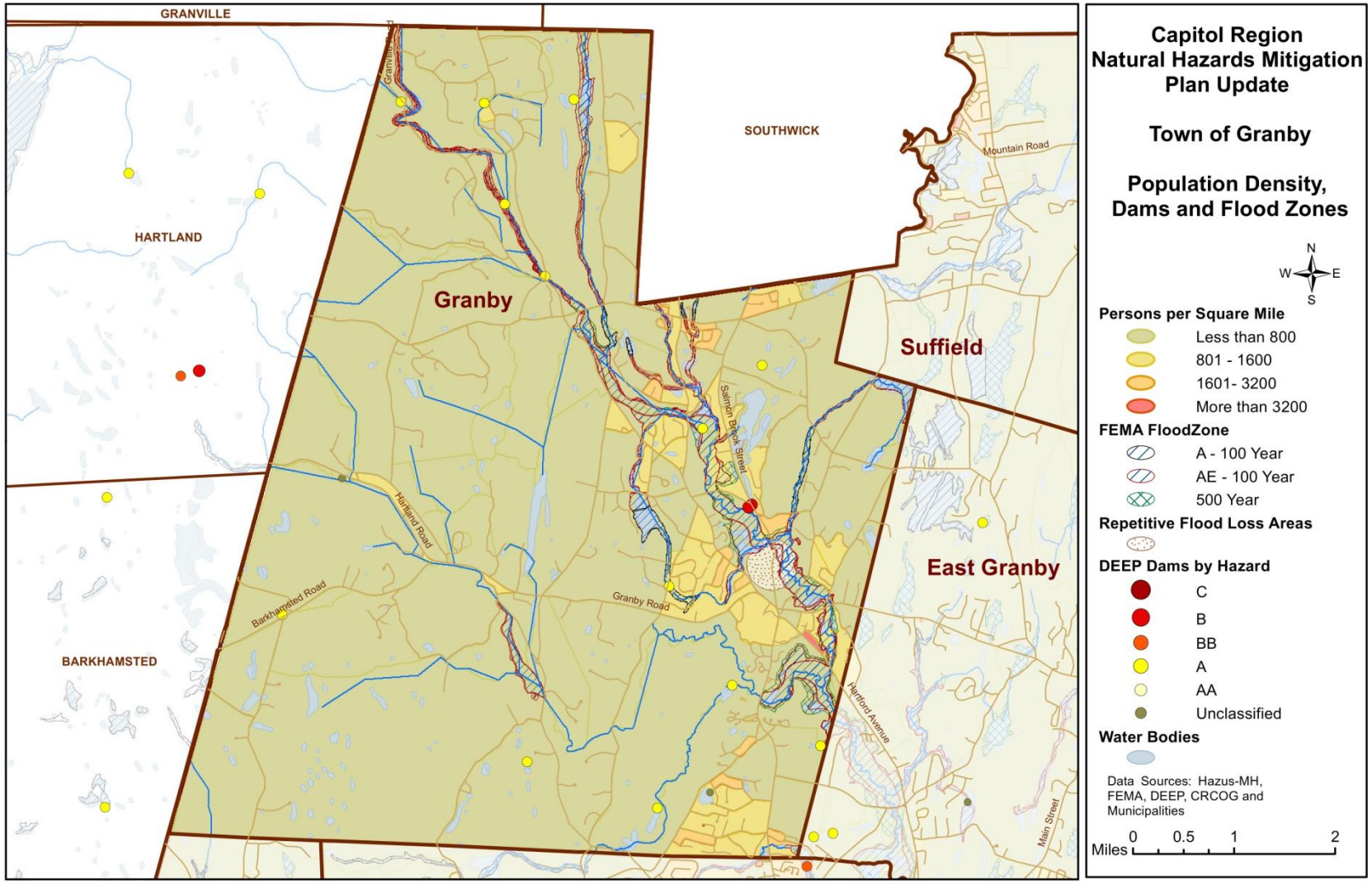
Priority: Medium

Status: The Town is currently working with the Lost Acres Fire Department on a dry hydrant requirement.

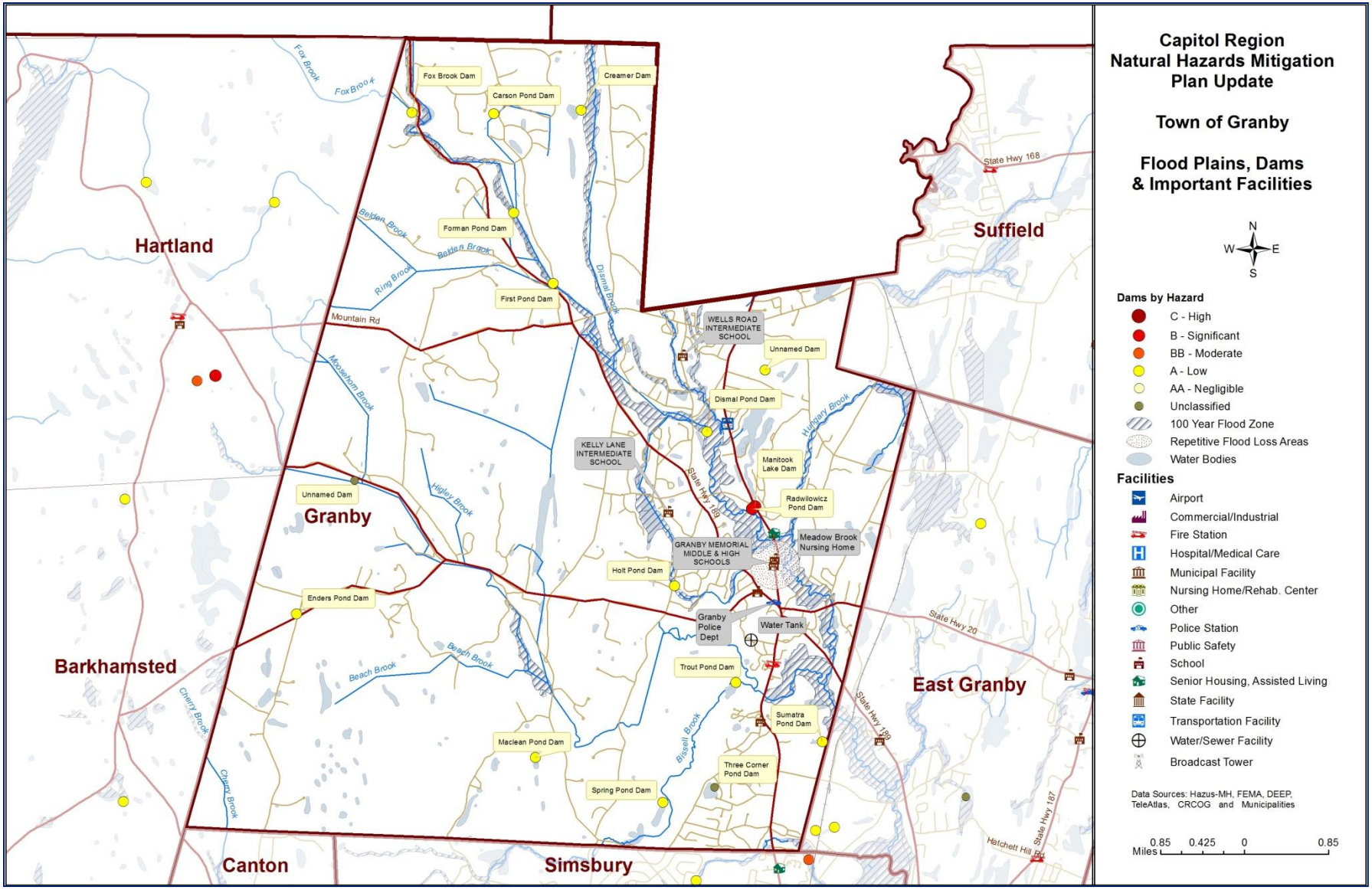
Potential Funding Source: local funds

Timeframe: Regulations are expected to be drafted in 2014 and are anticipated to be adopted by 2016.

Map 34: Granby Population Density, Dams and Flood Zones



Map 35: Granby Flood Plains, Repetitive Loss Areas, Dams and Important Facilities



Hartford

Hartford, Connecticut's capital city, is an urban community centrally located within the Region. It has a land area of 17.3 square miles and an estimated population of nearly 125,000. The elevation ranges from approximately 30 to 150 feet above sea level. Hartford drains to two watersheds – the Connecticut River to the east and the Park River to the west. In addition to the Connecticut and Park Rivers, other watercourses within the City include Cemetery and Gully Brooks. Interstates 91 and 84 intersect in Hartford. State routes 44, 187 and 189 also traverse the City.

Hartford is home to the Capitol and numerous state office buildings and other facilities. Brainard Airport is located in the southeastern corner of the City. Numerous industries and businesses operate throughout Hartford, including many insurance companies. The City also houses three major hospitals: Hartford, Connecticut Children's, and St. Francis. The City is also home to Trinity College and the University of Hartford. The University of Connecticut and University of St. Joseph has branches in the Downtown area. Finally, Hartford attracts many visitors throughout the year to its historic, arts and cultural venues including among others the Convention Center, XL Center, Riverfront Recapture, Comcast Music Theater, the Wadsworth Athenaeum, the Connecticut Science Center, the Old State House, Mark Twain and Harriet Beecher Stowe Houses, and the Bushnell Center for Performing Arts.

Challenges

Historically, Hartford has suffered significant losses from flooding and continues to be vulnerable to the risks posed by flooding. The Army Corps of Engineers built a dike in Hartford along the Connecticut River following historic floods in 1936 and 1938. The City has maintained the levee system for 70 years, and recently began a $21 million capital improvement program devoted to the system. The flood control system is an Accredited Levee under FEMA's map modernization project. Hartford has not approved any building construction within the 100 year floodplain and has undertaken significant work since the adoption of the 2008 Plan to reduce its vulnerability to flooding as detailed in the list below:

Hartford Flood Control Projects completed during the period 2008 to 2013

1. Hartford Dike Repair and Maintenance Project: Completed in 2009, Cost: $5,000,000.
   Work accomplished: Levee Rip Rap Repair, Vegetation removal and animal burrow repair, Structural repairs on flood wall, Toe drain and drainage ditch repairs, construction of Access road on river side, Perform system certification analysis, testing and engineering.
2. Replacement of Diesel Engines, Gears and Equipment at North Meadow Pump Station and South Meadow Pump Station: Completed: 2009, Cost: $624,000
   Work accomplished: Replaced four diesel engines at South Meadow pump station and four diesel engines at North Meadow pump station. Changed the gear box ratio for eight pumps. Installed five backstops for engines at South Meadow pump station.
3. Replacement of Valve Operators at Three Pump Stations: Completed: 2008, Cost: $475,000
   Work accomplished: Replaced Valve Operators at South Meadow, Keney Lane and Bushnell park pump stations.
4. Replacement of Valve Operators at North Meadow Pump Station: Completed: 2009, Cost: $294,000
   Work accomplished: Replaced four valve operators at North Meadows pump station.
5. Folly Brook Conduit Repairs: Completed: 2011, Cost: $ 1.00 Million

Work accomplished: Internal repair/rehabilitation to concrete and steel sections.

6. Park River and Auxiliary Conduits Sediment Removal and Maintenance: Completed: 2011, Cost: $2.9 Million

Work accomplished: Removed 8500 CY of Sediment from Auxiliary Conduit.

7. Weston Street and West Service Road Drainage Improvement (Phase 1): Completed: 2009, Cost: $283,000.00

Work accomplished: Drainage improvements to correct levee interior drain problem.

8. North and South Meadows Pond Dredging and Restoration Project: Completed 2013, Cost: $3,880,000

Work accomplished: Removed sediment from North Meadow Pond and South Meadow Pond. Installed fore bays at inlet locations in the pond.

9. Bulkeley Bridge Under Seepage Analysis: Completed: 2011, Cost: $ 200,000.00

Installed new Piezometers to measure levee under seepage.

In addition to the map modernization project, the Metropolitan District Commission's (MDC) Clean Water Project also poses significant opportunities and challenges to the City. As planning for the separation of storm water and sewer lines in the City and region, much of which discharges to the Connecticut River in Hartford, it is critical for the City to monitor potential impacts on flood control infrastructure.

The National Flood Insurance Program has paid fifty property damage claims in Hartford totaling $649,546 to-date. Hartford has had nine Repetitive Loss Property claims to-date on two properties with payments totaling $83,047. A significant flood event could result in much damage. CRCOG used FEMA's Hazus-MH model to analyze the risks that the City of Hartford might face from a major flood. The model estimates that economic losses to the town including residential and commercial damage and business interruptions due to a flood having a 1% chance of occurring any given year (the 100-year flood) would be over $206 million. The impacts of such a flood are summarized below:

Estimated Damages from 100-Year Flood	Households Displaced	812
	People Needing Shelter	2,034
	Buildings at Least Moderately Damaged	61
	Expected Damage to Essential Facilities	At least moderate damage and loss of use to one fire station and one school
	Total Estimated Economic Losses	$206,450,000
	Total Residential Building & Content Losses	$38,770,000
	Total Commercial, Industrial & Other Building & Content Losses	$165,740,000
	Total Business Interruption Losses	$1,950,000

CRCOG also used FEMA's Hazus-MH model to analyze the risks that the City of Hartford might face from a hurricane as powerful as the 1938 hurricane. The model estimates that economic losses to the town including residential and commercial damage and business interruptions due to such a Category 3 hurricane would be nearly $565 million. The City's hospitals would likely suffer moderate damage but would not be expected to experience loss of use. The impacts of such a storm are summarized below:

Estimated Damages from a 1938 Strength Hurricane	Households Displaced	1707
	People Needing Shelter	625
	Buildings at Least Moderately Damaged	3134
	Buildings Completely Damaged	58
	Total Estimated Economic Losses	$564,530,000
	Total Residential Building Losses	$343,675,000
	Total Commercial, Industrial & Other Building Losses	$140,680,000
	Total Business Interruption Losses	$80,175,000
	Total Debris Generated	88,973tons
	Truckloads (at 25 tons/truck) of building debris	2820

According to information from the City and Connecticut Department of Emergency Management and Homeland Security, the three federally declared natural disasters of 2011 resulted in total expenses to the City and other local public and nonprofit agencies of over $7.4 million. These expenses include debris and snow removal, emergency protective measures and repairs to damaged infrastructure and buildings but do not include damages experienced by private citizens and businesses.

2011 Disasters Damage Amounts Eligible for 75% Reimbursement Under FEMA Public Assistance Program				
Applicant **City & Other Agencies** **Other = Fire Districts, Schools, Private Non-Profit Agencies**	**100% of Amount Eligible for 75% Reimbursement**			**Total Damages Eligible for Public Assistance Due to 2011 Disasters**
	DR-1958-CT 2011 Snow WS Charlotte	**DR-4023-CT Irene August 2011**	**DR-4046-CT Severe Weather Oct 2011 Alfred**	
City of Hartford	$1,996,519.30*	$176,984.14	$3,895,708.62	$6,069,212.06
Other Agencies	$230,581.69	$261,043.73	$876,819.30	$1,368,444.72
Hartford Total	**$2,227,100.99**	**$438,027.87**	**$4,772,527.92**	**$7,437,656.78**

Amount being reviewed by FEMA

Goals, Objectives and Strategies

GOAL: REDUCE LOSS OF LIFE, PROPERTY AND ECONOMIC CONSEQUENCES AS A RESULT OF NATURAL DISASTERS

Objective 1:
Reduce the likelihood of flooding by improving existing natural and artificial drainage systems.

Currently the MDC is addressing this issue with improvements to existing systems. The City's DPW is also making improvements to plans and operational systems to address flooding.

Strategic Actions:

1.1 Pursue priority drainage projects identified in Capital Improvement Plan.
Lead: Public Works, Emergency Management, Administration

Priority: High
Status: This is an established and sustained effort. Work is expected to be undertaken annually contingent upon availability of funding
Potential Funding Sources: City operating budget, Federal & State
Timeframe: 2014-2019

Objective 2:
Address combined sewer overflows.

The MDC has made systematic improvements to the sewer systems within city limits to address overflow issues consistent with heavy rains.

Strategic Actions:

2.1 Continue to participate in the MDC's Clean Water Project planning process.
Lead: Metropolitan District (MDC), Public Works, Emergency Management
Priority: High
Status: This is an established and sustained effort. Staff will continue participation in periodic meetings with MDC.
Potential Funding Sources: MDC
Timeframe: 2014-2019

2.2 Ensure that the City's flood control pump stations can handle changes that may result from MDC measures to address combined sewer overflows.
Lead: Public Works, Emergency Management
Priority: High
Status: This is an established and sustained effort. Reviews are conducted as information becomes available.
Potential Funding Sources: City operating budget, Federal & State
Timeframe: 2014-2019

Objective 3:
Ensure proper maintenance of flood control system.

The City's DPW has a detailed plan for maintaining the existing flood control systems.

Strategic Actions:

3.1 Continue to implement necessary repairs and upgrades required by FEMA and the Army Corps of Engineers to retain certification.
Lead: Public Works, Emergency Management
Priority: High
Status: This is an established and sustained effort.
Potential Funding Sources: City operating budget, Federal, State
Timeframe: Work to be scheduled annually during the 2014-2019 plan period

3.2 Update the flood control system maintenance manual.
Lead: Public Works, Emergency Management
Priority: Medium
Status: This is an established and sustained effort. Periodic updates will be made as needed.
Potential Funding Sources: local
Timeframe: 2014-2019

3.3 Train City employees, according to the updated manual, in proper maintenance techniques.
Lead: Public Works
Priority: Medium
Status: This is an established and sustained effort.
Potential Funding Sources: local
Timeframe: It is anticipated that training will be offered at least annually throughout the 2014-2019 plan period.

3.4 Upgrade flood control facilities to automate warning systems and as many other features as possible to increase safety.
Lead: Public Works
Priority: High
Status: Deferred while funding is investigated.
Potential Funding Sources: Grants, state bonding
Timeframe: 2014 – 2019

Objective 4:
Develop system for identifying and addressing potential debris hazards.

The Department of Public Works has contingent plans and resources to address potential post-storm debris issues and is working with the State's Interagency Debris Management Task Force CCM Municipal Management Bulletin #13-24.

Strategic Actions:

4.1 Pursue priority debris related projects, especially along the North Branch of the Park River, identified in the Capital Improvement Plan
Lead: Public Works, Emergency Management
Priority: Medium
Status: This is an established and sustained effort.
Potential Funding Sources: City operating budget, Federal & State
Timeframe: 2014-2019: Annually, contingent upon funding

4.2 Inspect and clean Park River relief conduit.
Lead: Public Works
Priority: Medium
Status: This is an established and sustained effort.

Potential Funding Sources: City operating budget, Federal & State
Timeframe: 2014-2019: Every year

Objective 5:
Improve the ability of emergency responders to prepare and respond to natural disasters.

Hartford Fire Department's Department Directive titled "Storm Warnings and Preparedness" (DD 4.1 EOP) directly addresses the preparation levels necessary to effectively organize and respond to natural disasters. CRCOG's Regional Emergency Support Plan (RESP Plan) also provides preparedness and response direction.

Strategic Actions:

5.1 Continue with National Incident Management System (NIMS) and Incident Management Team training, with a particular focus on response to natural disasters.
Lead: Police, Fire, Emergency Management, Health & Human Services, Public Works, Emergency Services & Telecommunications
Priority: High
Status: This is an established and sustained effort.
Potential Funding Sources: Regional & State Partners
Timeframe: It is anticipated that training will be offered at least annually during the 2014-2019 plan period

5.2 Investigate communications systems that will allow for emergency personnel to communicate in currently uncovered areas, and will facilitate interdepartmental communications along the flood control system.
Lead: Emergency Management, Police, Fire, Health & Human Services, Public Works, Emergency Services & Telecommunications
Priority: Low
Status: Completed

5.3 Research, identify means, including potential acquisition of public address systems, for facilitating communications with residents, especially those in low-income areas vulnerable to disasters.
Lead: Emergency Management, Police, Fire, Emergency Services & Telecommunications
Priority: Medium
Status: Work is currently being undertaken.
Potential Funding Sources: Federal, State, & Regional
Timeframe: Study expected to be completed 2014

Objective 6:
Improve the ability of emergency responders to serve special needs populations during natural disasters.

The Hartford Fire Department's Special Services division in conjunction with the City of Hartford's CERT team have prepared and trained to address this specific issue. CRCOG's Regional Emergency Support Plan (RESP Plan) also provides preparedness and response direction.

Strategic Actions:

6.1 Take full advantage of the Reverse-911 system.
Lead: Police, Fire, Emergency Management, Health & Human Services, Emergency Services & Telecommunications
Priority: Medium
Status: Completed

6.2 Continue training for evacuation of special needs populations.
Lead: Police, Fire, Emergency Management, Health & Human Services
Priority: Medium
Status: This is an established and sustained effort.
Potential Funding Sources: None needed
Timeframe: 2014-2019: training will be offered annually.

6.3 Support regional assessments of how to identify, maintain and use databases of special needs populations.
Lead: Emergency Management, Health & Human Services
Priority: Medium
Status: This is a sustained effort.
Potential Funding Sources: City operating budget, Federal & State
Timeframe: 2014-2019

Objective 7:
Improve emergency communications to residents prior to and during natural disasters.

Hartford Fire Department has several communication methods in place such as Twitter, Facebook, Social Media, Media, Everbridge Notification System, as well as a new method soon to be implemented utilizing a smart phone app.

Strategic Actions:

7.1 Continue to offer educational forums for residents on personal emergency planning.
Lead: Health & Human Services, Emergency Management
Priority: Medium
Status: This is an established and sustained effort.
Potential Funding Sources: Federal, State, City operating budget
Timeframe: 2014-2019: It is anticipated that forums will be offered at least annually.

7.2 Consider applying to FEMA's Community Rating System (CRS) program to help reduce flood insurance premiums for property owners.
Lead: Emergency Management, Planning, Public Works

Priority: Medium
Status: Ongoing
Potential Funding Sources: City operating budget, Federal & State
Timeframe: 2014/2015: 3 months

Objective 8:
Ensure ability of City to safely shelter in place, and when necessary, evacuate residents and visitors.

The City has several shelters in place to serve as gathering points in an emergency. The Hartford Fire Department's Special Services division in conjunction with the City of Hartford's CERT team have prepared and trained to address this specific issue. CRCOG's Regional Emergency Support Plan (RESP Plan) also provides preparedness and response direction.

Strategic Actions:

8.1 Participate in local and regional hurricane evacuation training.
Lead: Emergency Management, Police, Fire
Priority: High
Status: Ongoing: Training exercise completed June 20, 2013. Further training as available will be completed during the 2014-2019 plan period.
Potential Funding Sources: Federal, State & Regional
Timeframe: 2014-2019

GOAL: ENSURE THE ABILITY TO DISTRIBUTE COMMODITIES.

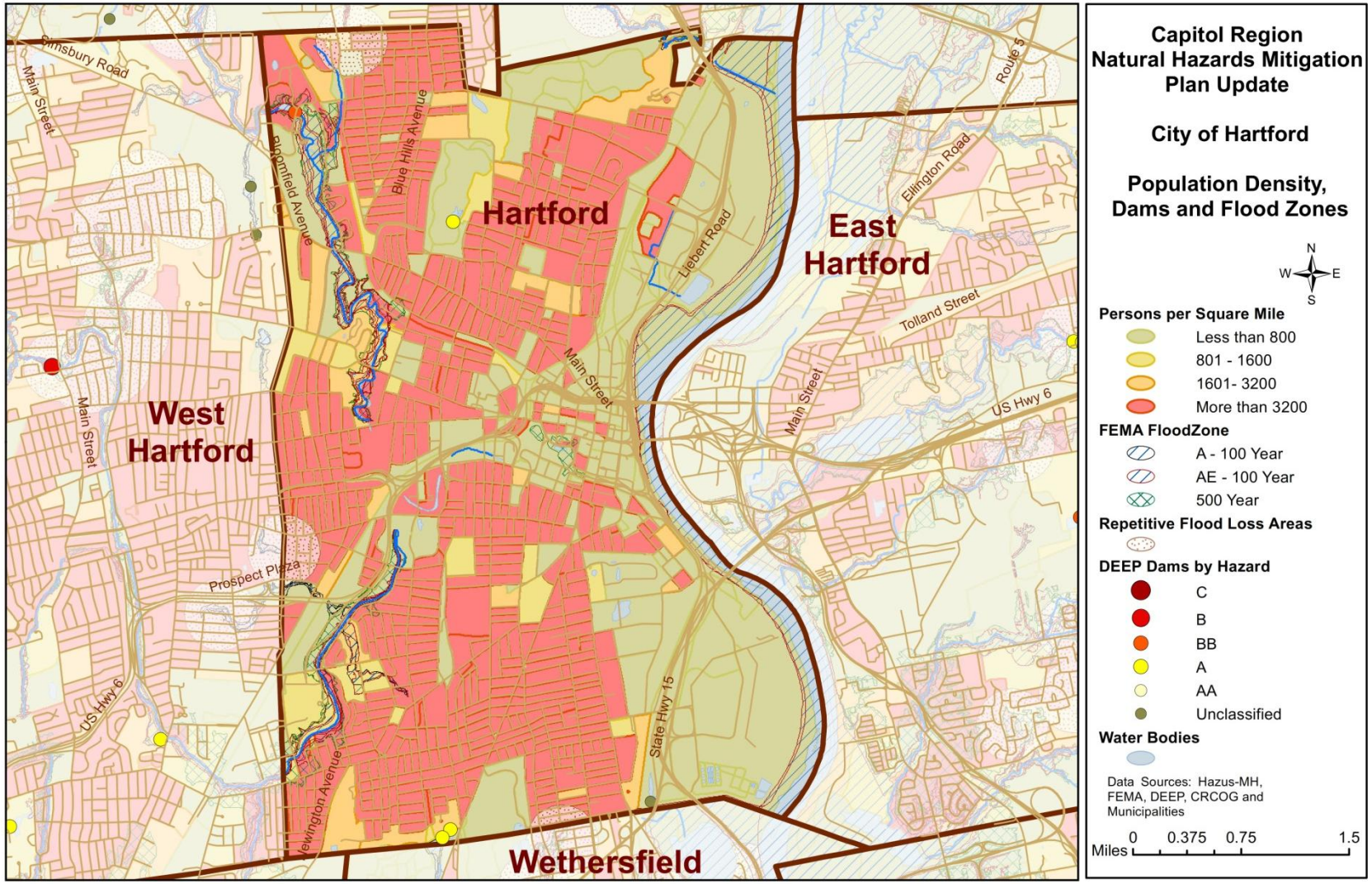
Objective 9:
Improve viability of food commodities during natural disasters.

The Hartford Fire Department's Special Services division in conjunction with the City of Hartford's CERT team have prepared and trained to address this specific issue. CRCOG's Regional Emergency Support Plan (RESP Plan) also provides preparedness and response direction. The City's Board of Education also has a plan to address this issue.

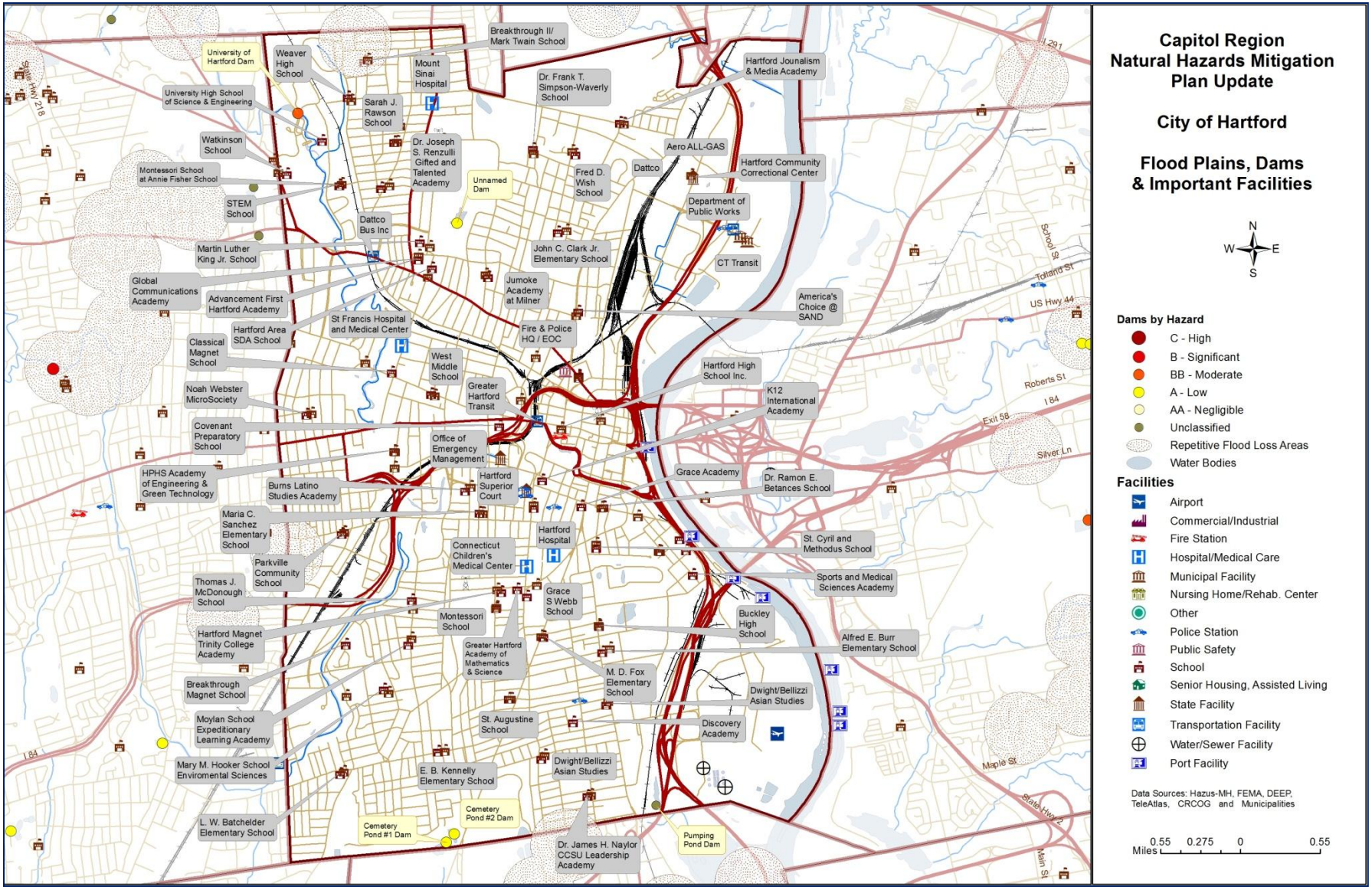
Strategic Actions:

9.1 Maintain refrigeration for perishable food items.
Lead: Board of Education, Emergency Management, Public Works, Health & Human Services
Priority: High
Status: New Initiative
Potential Funding Sources: Federal, State, Regional
Timeframe: 2014/2015: Within 9 months

Map 36: Hartford Population Density, Dams and Flood Zones



Map 37: Hartford Flood Plains, Repetitive Loss Areas, Dams and Important Facilities



Hebron

Hebron is a rural community in Tolland County, in the southeast corner of the Capitol Region. Major transportation routes through Hebron include state routes 66, 85, 207 and 316. The Town's land area covers 37 square miles with an estimated population of 9,700. According to the U.S. Census, between 2000 and 2010, the number of housing units has increased by nearly 15% to over 3,500 units. Most of the residential development in Hebron consists of single family homes. Recently, most new development has been constructed near the center of town.

The elevation in Hebron ranges from 300 to over 650 feet above sea level. Most water drains to the Salmon River Watershed, but a small portion in the northeast drains to the Willimantic Watershed. The principal watercourses in Hebron are Fawn, Mint, Raymond and Senate Brooks. The 184 acre Amston Lake is located in the southeast portion of Town. Amston Lake's water level is controlled by an earthen dam with a concrete spillway. The outlet of the lake is an unnamed watercourse that feeds into Raymond Brook. The dam was recently repaired and upgraded.

The Town relies on its underground water supply for its drinking water. Most residences and businesses rely on private wells for their drinking water supply. Public water, provided through a private water company, serves several neighborhoods including the Town Center and Amston Lake areas. The Town's most extensive aquifer is located in the Raymond Brook Marsh area. The aquifer has been identified in the Aquifer Protection Zone of the Town's Zoning Regulations. The Town actively seeks to protect sensitive lands and was recently awarded a state open space grant to purchase a 50 acre parcel near the Raymond Brook Marsh. Approximately 20% of the Town's land area is permanently protected open space.

Challenges

Among the challenges facing Hebron in the event of a natural disaster are providing adequate water supply and emergency shelter for residents. Public water service in the Town Center has recently been extended. The Fire Department inventoried all fire ponds and dry hydrants in Town and is now working to develop a plan for additional dry hydrant locations. The Town and Chatham Health District will need to monitor the available capacity of the sewer treatment plant and ability of the town's ground water reserves to address the needs of future development including fire suppression particularly in the event of drought. The Town is currently updating its Plan of Conservation and Development and will be assessing its infrastructure needs as part of that process.

The Town will also need to assess the capability of the RHAM middle and high school to serve as regional emergency shelters. Hebron, Andover and Marlborough share a regional middle/high school (RHAM) located in the center of the town of Hebron. The high school is being considered for use as a regional general population shelter while the middle school is being considered for use as a special needs shelter. Electrical upgrades, generators and fuel capacity sufficient to provide power to operate bathroom and cooking facilities are needed to enable the schools to be used as emergency shelters.

The three federally declared disasters of 2011 tested the Town's ability to respond to severe snow and tropical storms. According to information from the Connecticut Department of Emergency

Management and Homeland Security, these three natural disasters of 2011 resulted in total expenses to the municipality and other public and private nonprofit agencies of $163,197. These expenses include debris and snow removal, emergency protective measures and repairs to damaged infrastructure and buildings but do not include damages experienced by private citizens and businesses.

2011 Disasters Damage Amounts Eligible for 75% Reimbursement Under FEMA Public Assistance Program				
Applicant Town & Other Other = Fire Districts, Schools, Private Non-Profit Agencies	100% of Amount Eligible for 75% Reimbursement			Total Damages Eligible for Public Assistance Due to 2011 Disasters
	DR-1958-CT 2011 Snow	DR-4023-CT Irene August 2011	DR-4046-CT Severe Weather Oct 2011 (Alfred)	
Town of Hebron	$47,786.22	$61,537.03	**$35,050.27**	$144,373.52
Hebron Other	$12,081.81	$6,741.62		$18,823.43
Hebron Total	**$59,868.03**	**$68,278.65**	**$35,050.27**	**$163,196.95**

The loss of power is particularly challenging because the Town has hundreds of residences and businesses which rely on wells and grinder pumps. Also, the Town Hall does not have back up power. Debris management after storm events is another concern for the Town. Hebron's landfill is capped and cannot be used for debris disposal.

CRCOG used FEMA's Hazus-MH model to analyze the risks that the Town of Hebron might face from a hurricane as powerful as the 1938 hurricane. The model estimates that economic losses to the town including residential and commercial damage and business interruptions due to such a Category 3 hurricane would be significant and could be over $46 million. The impacts of such a storm are summarized below:

Estimated Damages from a 1938 Strength Hurricane	Households Displaced	4
	People Needing Shelter	0
	Buildings at Least Moderately Damaged	335
	Buildings Completely Damaged	22
	Total Estimated Economic Losses	$46,100,000
	Total Residential Building Losses	$38,940,000
	Total Commercial, Industrial & Other Building Losses	$3,190,000
	Total Business Interruption Losses	$3,970,000
	Total Debris Generated	69,870 tons
	Truckloads (at 25 tons/truck) of building debris	140

The Town of Hebron has worked to limit its vulnerability to flood hazards. In 2004, a structure in a floodplain on Grayville Road was modified to place all mechanical equipment above flood elevation. No new construction has occurred in a floodplain since 2008. The building codes are based on FEMA requirements or reference FEMA recognized ASCE 24 construction standards. The National Flood Insurance Program has paid three property damage claims in Hebron totaling $5,043.26 to-date. Hebron has no Repetitive Loss Property claims to-date. Although flooding is not as large a concern in Hebron as in some other communities, a significant flood event could result in much damage. CRCOG used FEMA's Hazus-MH model to analyze the risks that the Town of Hebron might face from flooding. The model estimates that economic losses to the town including residential and commercial damage and business

interruptions due to a flood having a 1% chance of occurring any given year (the 100-year flood) would be over $4 million. The impacts of such a flood are summarized below:

Estimated Damages from 100-Year Flood	Households Displaced	74
	People Needing Shelter	37
	Buildings at Least Moderately Damaged	0
	Total Estimated Economic Losses	$4,400,000
	Total Residential Building & Content Losses	$2,870,000
	Total Commercial, Industrial & Other Building & Content Losses	$1,520,000
	Total Business Interruption Losses	$0

Goals, Objectives and Strategies

GOAL: ASSURE ADEQUACY OF RESPONSE TO WINTER STORMS

Objective 1:
Provide adequate equipment, staff and other resources to maintain passable roads and facilitate power restoration.

Strategic Actions:

1.1 Maintain and implement equipment replacement schedules.
Lead: Public Works
Priority: Medium
Status: Annually through CIP
Potential Funding Sources: General operating fund
Timeframe: 2014-2019: to be reviewed annually during budget process

1.2 Investigate regional service sharing initiatives.
Lead: Public Works, Administration
Priority: Medium
Status: Hebron has participated in several service sharing projects in the past including GIS flight and mapping project and a trails maintenance project. The Town will continue to investigate service sharing opportunities which can improve response to natural disasters.
Potential Funding Sources: General operating fund, grants
Timeframe: 2014-2019

1.3 Continue informal arrangements with private contractors.
Lead: Public Works
Priority: Medium

Status: Contractors are routinely put on notice of approaching needs and opportunities
Potential Funding Sources: General operating fund
Timeframe: 2014-2019

1.4 Continue with tree maintenance program.
Lead: Public Works
Priority: High
Status: This is a sustained effort. There is a continual need for tree maintenance.
Potential Funding Sources: General operating fund
Timeframe: 2014-2019

1.5 Expand salt/sand storage facilities.
Lead: Public Works, Administration
Priority: High
Status: This project is in the planning stage
Potential Funding Sources: CIP
Timeframe: Expected to be in place by 2015

Objective 2:
Educate public on how to prepare for hazardous conditions.

Strategic Actions:

2.1 Continue to maintain special needs population list for monitoring during emergency situations.
Lead: Emergency Management, Fire Marshal, Police
Priority: High
Status: The Town has an established and sustained public education and outreach effort to at risk population through registration in the Everbridge
Potential Funding Sources: General operations budget, EMD, Fire Marshal's budget. Free publications from Department of Health and Fire Administration, Everbridge reverse notification system currently funded through Preparedness grant through Chatham Health District. Funding may not be in place in 2014 due to cuts in bioterrorism budget at State level. The system currently in place will be maintained throughout the 2014 -2019 planning period.
Timeframe: 2014-2019 with an annual review.

2.2 Develop and disseminate public outreach materials to citizens.
Lead: Emergency Management
Priority: High
Status: Because there is a continual need to keep residents informed, the Town undertakes outreach efforts on a sustained basis. Updated materials are posted on the Town's website and mailed to residents periodically and handed out at special interest group meetings. Efforts will continue.

Potential Funding Sources: General operating fund
Timeframe: 2014- 2019

GOAL: OPTIMIZE MITIGATION ACTIVITIES AGAINST NATURAL HAZARDS

Objective 1:
Minimize risk of forest fires.

Strategic Actions:

1.1 Continue to encourage installation of dry hydrants in new developments without water sources.
Lead: Planning
Priority: High
Status: The Planning and Development Department routinely encourages installation of dry hydrants in areas without access to public water supplies in predevelopment and weekly staff meetings with developers and builders. It is recommended this practice continue.
Potential Funding Sources: General Fund
Timeframe: 2014-2019

1.2 Develop and implement timber management plan for town-owned forested land.
Because this is expected to be a long term, multi-year project, for the 2014-2019 Plan period, the action to be taken is to complete a draft plan.
Lead: Planning, Public Works
Priority: Medium
Status: Research needed
Potential Funding Sources: Federal and state grants and local funds
Timeframe: 2015-2019

Objective 2:
Minimize risk from flooding.

Strategic Actions:

2.1 Continue to monitor bridges and culverts for adequate flow capacity.
Lead: Public Works
Priority: High
Status: Reports received periodically from the State of Connecticut Assessments will continue to be made routinely as crews are in the field.
Potential Funding Sources: CIP and operating fund
Timeframe: 2014 – 2019

2.2 Continue to enforce development regulations to minimize impacts on wetlands and flood zones.

Lead: Planning, Engineering

Priority: High

Status: The Planning and Development Department coordinates the development review process; conducts weekly staff meetings with potential developers and builders; ensures technical review by the Town Engineer, Fire Marshal and Chatham Health District staff; and advises the Planning and Zoning Commission and Inland Wetlands Commission on staff recommendations. Efficient enforcement of development regulations is routine for the Department whose offices include: the Town Planner, the Building Official, the Zoning Enforcement Officer, the Wetlands Agent, and the Water Pollution Control Administrator. This effort will continue to be carried out on a routine basis as development proposals are received and construction is undertaken.

Potential Funding Sources: General fund

Timeframe: 2014-2019

THE FOLLOWING ADDITIONAL OBJECTIVES AND MITIGATION STRATEGIES ARE PROPOSED TO BE INCLUDED IN THE 2014 – 2019 PLAN UPDATE:

Objective 3:

Improve ability of town and residents to prepare for and respond to severe weather

Strategic Action:

1.1 Establish RHAM High School as a regional shelter

Because this is expected to be a long term, multi-year project, for the 2014-2019 Plan period, the action to be taken is to develop a scope of work for establishing the school as a shelter.

Lead: Town Administration, Region Eight Board of Education, Emergency Management CEOs from Hebron, Marlborough, Andover

Priority: High

Status: New

Potential Funding Sources: Grant funding

Timeframe: 2014-2019

1.2 Establish Town Hall as the Emergency Operations Center with generator

Lead: Town Administration, Emergency Management

Priority: High

Status: This is a new initiative; however, an application was submitted in the spring of 2013 for funding under the Hazard Mitigation Grant Program for a generator. To be completed in 2014 dependent upon availability of funding.

Potential Funding Sources: Grant funding

Timeframe: By end of 2014

1.3 Establish the Fairgrounds as a shelter for pets and other animals and as a staging location for shuttle service to and from the shelter. Because this is expected to be a long term, multi-year project, for the 2014-2019 Plan period, the action to be taken is to develop a scope of work for establishing the school as a shelter.

Lead: Town Administration Emergency Management, Lion's Club, supporting town Administrations, local Veterinarians

Priority: High

Status: This is a new initiative.

Potential Funding Sources: Grant funding, donations initially, no funding is in place in town budgets, but is recognized as a regional need.

Timeframe: 2014-2019

Objective 4:

Improve School Security and response to emergency situations

Strategic Action:

1.1 Establish a security review of all schools, reevaluate current school plans, and establish Standard Operations Plan (SOP) for all schools in the Town of Hebron. Because this is expected to be a long term, multi-year project, for the 2014-2019 Plan period, the action to be taken is to complete the security review and evaluation of current school plans.

Lead: Emergency Management, Hebron Schools, RHAM Regional School, Fire Marshal, Connecticut State Police (CSP)

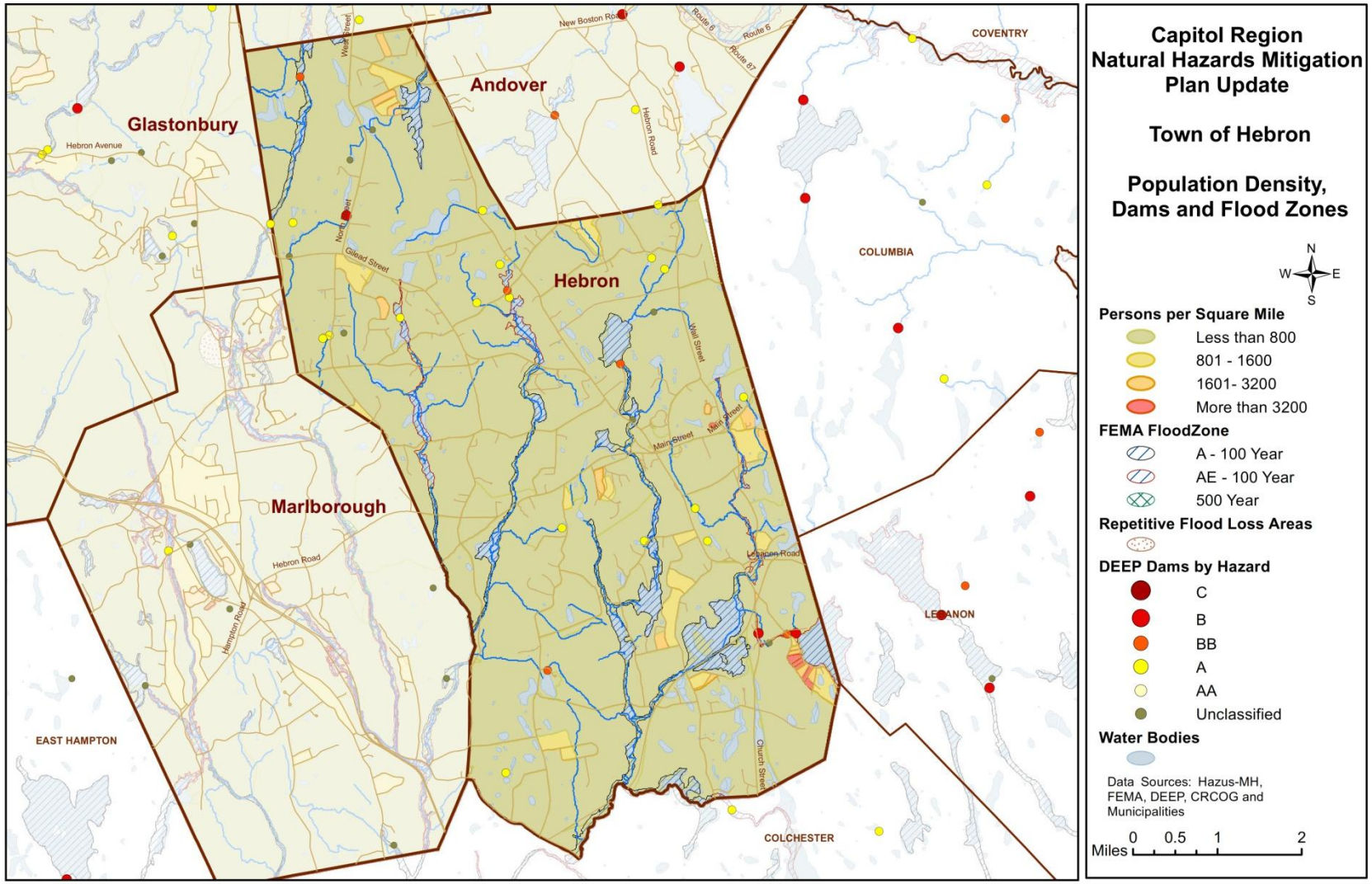
Priority: High

Status: This is a new initiative. Planning has begun, school self-survey has been conducted winter 2013, identifying and prioritize gaps found in the survey. CSP team has conducted walkthrough 6-12-2013. Confirm findings and immediate needs to address short term, and seek funding sources for long term solutions.

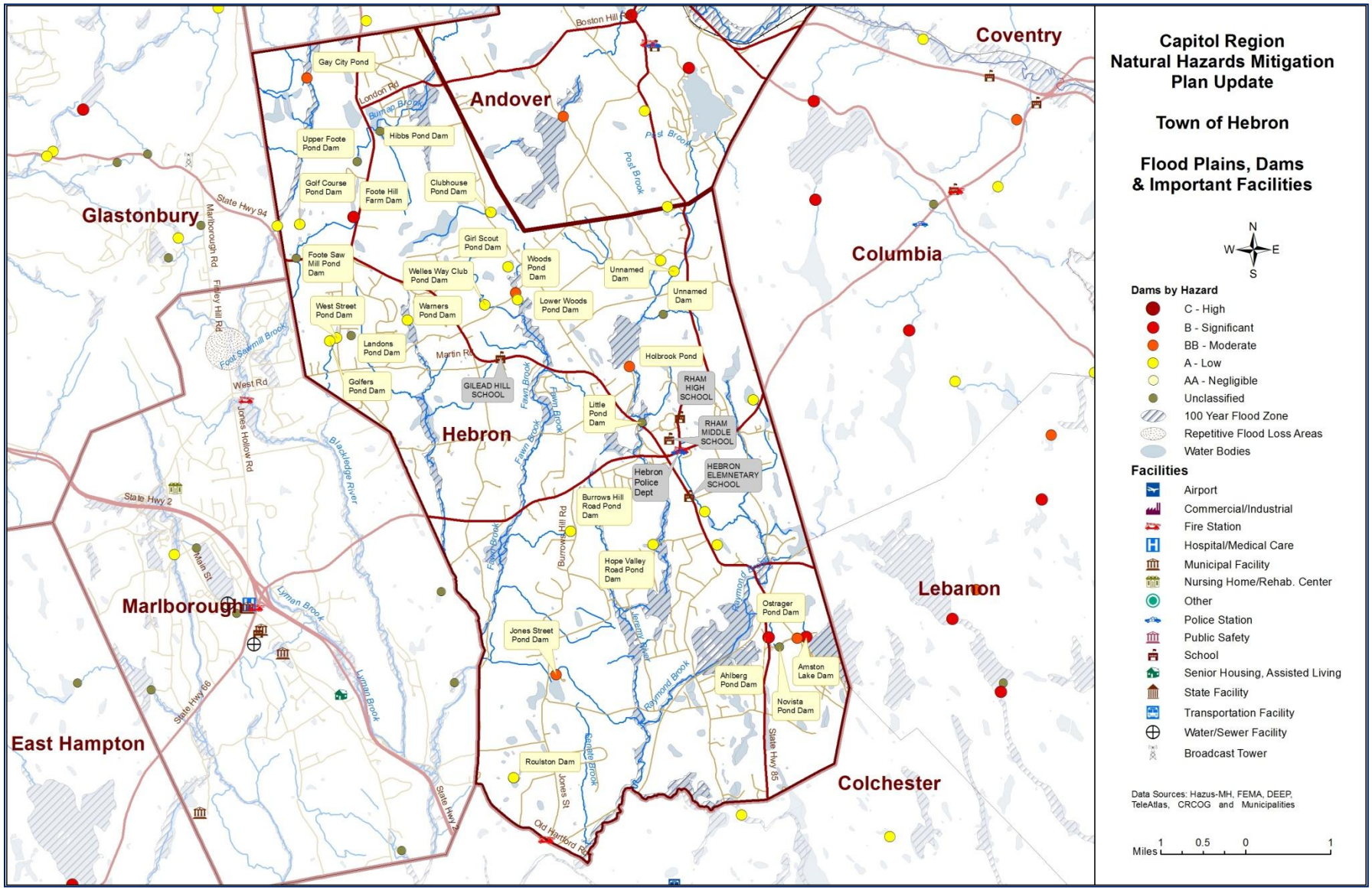
Potential Funding Sources: Grants, School board funding,

Timeframe: 2014-2019.

Map 38: Hebron Population Density, Dams and Flood Zones



Map 39: Hebron Flood Plains, Repetitive Loss Areas, Dams and Important Facilities



Manchester

Manchester is a fully suburban community of over 58,000 located east of East Hartford. The Town covers about 27.3 square miles. Elevation ranges from about 80 to 500 feet above sea level and Manchester's land area drains primarily to the Hockanum River and its watershed. Small areas along the southern border of the town drain to the main stem of the Connecticut River Watershed. In addition to the Hockanum River, other major waterways in Manchester include: Bigelow, Birch Mountain, Lydall and Porter Brooks. Several regionally significant transportation routes run through Manchester including Interstates 84, 384 and 291, as well as state routes 44/6 and 83. Principal industries include: engineered fibers, steel metal fabrication, plastics, machine tool companies, printing, warehouse/distribution facilities, electronic equipment, aircraft and missile components. Manchester is also home to one of the largest regional retail concentrations in New England. The Buckland Hills area includes over 3 million square feet of retail and services anchored by the Buckland Hills Mall, over 300 hotel rooms, restaurants, and movie theaters. The Town also boasts the Cheney Brothers National Register Historic District which includes historic mills and housing, and the downtown Main Street National Historic Register district.

Challenges

Manchester owns and operates its own water company. The protection and management of significant forested watershed land and the multiple stratified-drift aquifers relied upon by the residents of Manchester is paramount. In addition, Manchester is fortunate to have a significant open space recreation area of regional importance. The vast and rugged forested landscape known as Case Mountain Recreation Area poses some fire risk, especially at the natural/residential interface. Finally, there is some hazard potential to Manchester if there is a failure of an impoundment in towns upstream. Manchester will continue to maintain communications regarding potential hazards.

Since 2008, the Town of Manchester Public Works Department has received Flood Plain Zone and Wetlands Permit approval for five (5) projects including structural improvements to stormwater drainage infrastructure in Special Flood Hazard Areas that help mitigate flood risks. No new construction of primary residential or commercial structures has been permitted in the Special Flood Hazard Area. The Planning and Zoning Commission and Inland Wetlands and Watercourses Agency has approved several minor structural renovations, installation of accessory structures and site improvements in regulated areas in accordance with the flood hazard reduction and resource compensation standards outlined in the Zoning and Inland Wetlands and Watercourses Regulations. Manchester revised its Flood Plain Zone regulations in 2008 to meet required standards for participation in the National Flood Insurance Program. In accordance with the adopted standards, encroachments in the floodway are prohibited and any reduction of water holding capacity in the Special Flood Hazard Area caused by filling, new construction or substantial improvements shall be compensated for by deepening and/or widening of the flood plain.

The National Flood Insurance Program has paid 26 property damage claims in Manchester totaling $106,585 to-date. Manchester has had four Repetitive Loss Property claims on two properties totaling $43,204 to-date. A significant flood event could result in much damage. CRCOG used FEMA's Hazus-MH model to analyze the risks that the community might face from flooding. The model estimates that economic losses to the town including residential and commercial damage and business interruptions due to a flood having a 1% chance of occurring any given year (the 100-year flood) would be over $64 million. The impacts of such a flood are summarized below:

Estimated Damages from 100-Year Flood	Households Displaced	542
	People Needing Shelter	983
	Buildings at Least Moderately Damaged	11
	Total Estimated Economic Losses	$64,350,000
	Total Residential Building & Content Losses	$16,900,000
	Total Commercial, Industrial & Other Building & Content Losses	$47,180,000
	Total Business Interruption Losses	$280,000

CRCOG also used FEMA's Hazus-MH model to analyze the risks that the Town of Manchester might face from a hurricane as powerful as the 1938 hurricane. The model estimates that economic losses to the town including residential and commercial damage and business interruptions due to such a Category 3 hurricane would be nearly $320 million. The impacts of such a storm are summarized below:

Estimated Damages from a 1938 Strength Hurricane	Households Displaced	341
	People Needing Shelter	78
	Buildings at Least Moderately Damaged	2,475
	Buildings Completely Damaged	132
	Total Estimated Economic Losses	$319,740,000
	Total Residential Building Losses	$226,970,000
	Total Commercial, Industrial & Other Building Losses	$54,870,000
	Total Business Interruption Losses	$37,900,000
	Total Debris Generated	70,116,tons
	Truckloads (at 25 tons/truck) of building debris	1,357

According to information from the Connecticut Department of Emergency Management and Homeland Security, the three federally declared natural disasters of 2011 resulted in total expenses to the municipality and other local agencies of over $5.9 million. These expenses include debris and snow removal, emergency protective measures and repairs to damaged infrastructure and buildings but do not include damages experienced by private citizens and businesses.

2011 Disasters Damage Amounts Eligible for 75% Reimbursement Under FEMA Public Assistance Program				
Applicant: Town & Other Agencies (Fire Districts, Schools, Private Non-Profit Agencies)	**100% of Amount Eligible for 75% Reimbursement**			**Total Damages Eligible for Public Assistance Due to 2011 Disasters**
	DR-1958-CT 2011 Snow	**DR-4023-CT Irene August 2011**	**DR-4046-CT Severe Weather Oct 2011 (Alfred)**	
Town of Manchester	$195,625.42	$98,051.65	$5,490,873.84	$5,784,550.91
Manchester Other	$16,605.57		$120,205.26	$136,810.83
Manchester Total	**$212,230.99**	**$98,051.65**	**$5,611,079.10**	**$5,921,361.74**

Goals, Objectives and Strategies

GOAL: MINIMIZE LOSS TO CRITICAL INFRASTRUCTURE DUE TO FLOODING, WINTER STORMS, HURRICANES AND HIGH WINDS

Objective 1:
To reinforce, renovate and upgrade existing critical town facilities.

Strategic Actions:

1.1 Implement needed improvements to build a new Emergency Operations Center, when funding is available, at the Department of Public Works facility to withstand hurricanes and other disasters.
Lead: Facilities Management
Priority: High
Status: Completed

1.2 Implement needed upgrades to electrical system at the Senior Center, which is the primary emergency shelter to allow year-round use.
Lead: Facilities Management, Human Services
Priority: High
Status: Completed

1.3 Install operating generators at all primary and tertiary shelters and designated alternate care sites.
Lead: Facilities Management
Priority: Medium
Status: Completed

Objective 2:
To upgrade existing transportation infrastructure in order to allow for continuity of operations.

Strategic Actions:

2.1 Upgrade identified flood prone roadways to reduce potential for access being blocked due to flooding.
Lead: Public Works, Engineering
Priority: High
Status: Capital improvement program regularly includes funding for road and drainage upgrades that are used to address drainage issues and flood prone roadways. It is anticipated work will continue to be scheduled annually.
Potential Funding Source: Capital Improvement funds and local bonding
Timeframe: 2014-2019

2.2 Maintain list of on-call consultant engineers who can provide necessary assistance for structural and other specialized engineering assistance in response to impacts from natural disasters.

Lead: Public Works, Engineering
Priority: Medium
Status: Completed. The list is updated periodically.
Potential Funding Source: Capital Improvement funds, local bonding and General funds
Timeframe: 2014-2019; it is anticipated updates will be made annually

2.3 Upgrade bridge and/or other structure replacements based upon potential impact from flood hazards.
Lead: Public Works, Engineering
Priority: Medium
Status: Work is currently being undertaken; assessment of bridges under 20' completed. Hartford Road/Hop Brook bridge replacement project is currently in design phase.
Potential Funding Source: Local bond funds combined with State and local bridge program grants
Timeframe: 2013-2015

Objective 3:
To upgrade existing communication system in order to facilitate efficient emergency response in a natural disaster.

Strategic Actions:

3.1 Upgrade Emergency Operations Center communications system, including any necessary building upgrades.
Lead: Police, Fire, Facilities Management
Priority: High
Status: Completed

GOAL: REDUCE THE LIKELIHOOD OF FLOODING DAMAGES THROUGH MONITORING AND INCREASED PUBLIC AWARENESS

Objective 1:
Coordinate with the Town of Vernon to monitor dams and potential flooding along Hockanum River.

Strategic Actions:

1.1 Continue communications with Vernon emergency management personnel.
Lead: Emergency Management
Priority: High
Status: This is an established practice.
Potential Funding Source: General funds
Timeframe: 2014-2019

Objective 2:
Raise awareness of flooding risks among property owners.

Strategic Actions:

2.1 Determine real estate disclosure practices in high risk areas.
Lead: Planning
Priority: High
Status: This is an established practice.
Potential Funding Source: General funds
Timeframe: 2014-2019

2.2 Implement an educational system for property owners, including appropriate materials and means for information dissemination. (Include information on importance of properly maintaining private trees).
Lead: Planning
Priority: Medium
Status: This is an established practice.
Potential Funding Source: General funds
Timeframe: 2014-2019

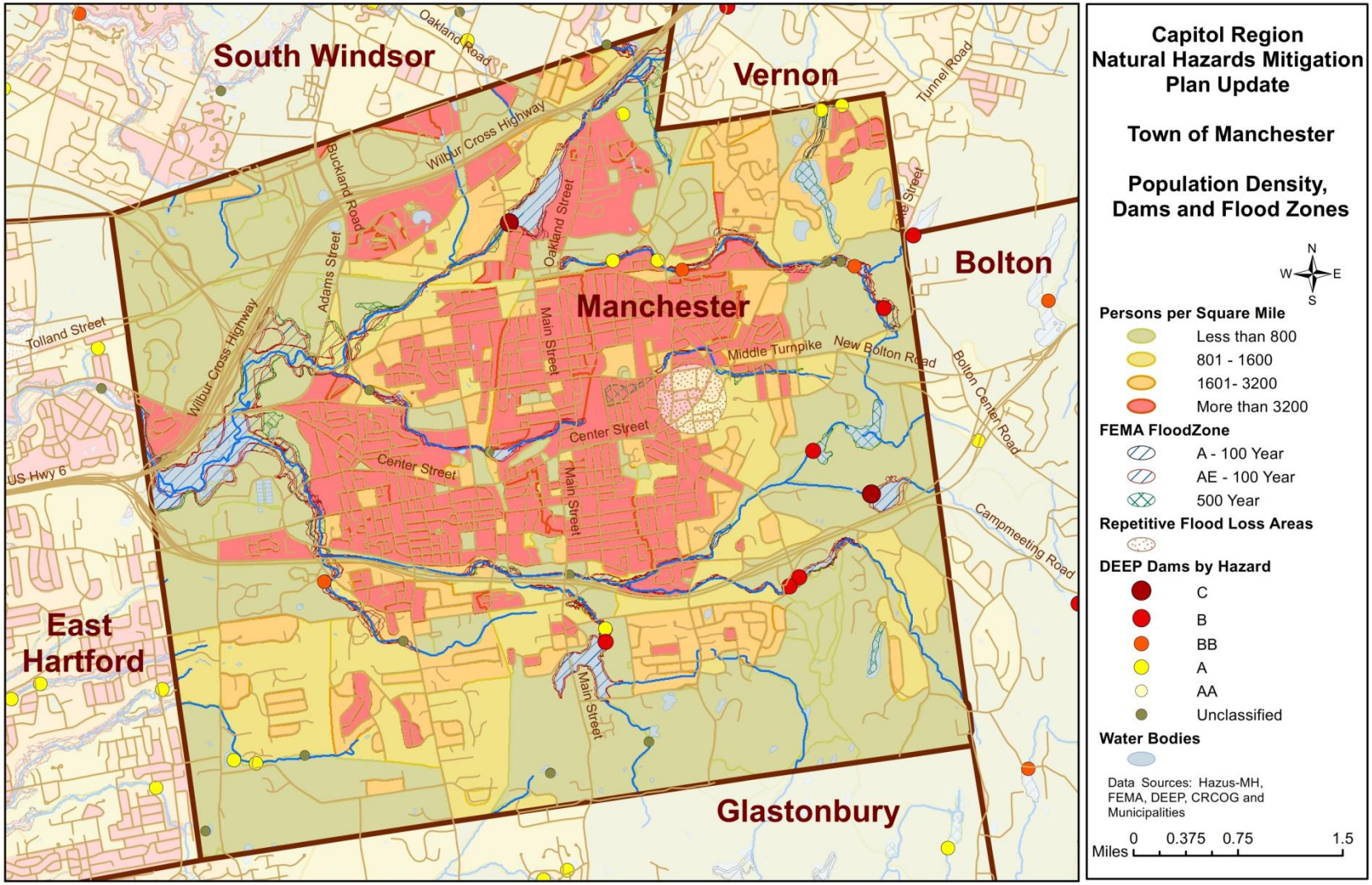
Objective 3:
Raise awareness of public health concerns from flooding of private wells and/or on-site septic systems.

Strategic Actions:

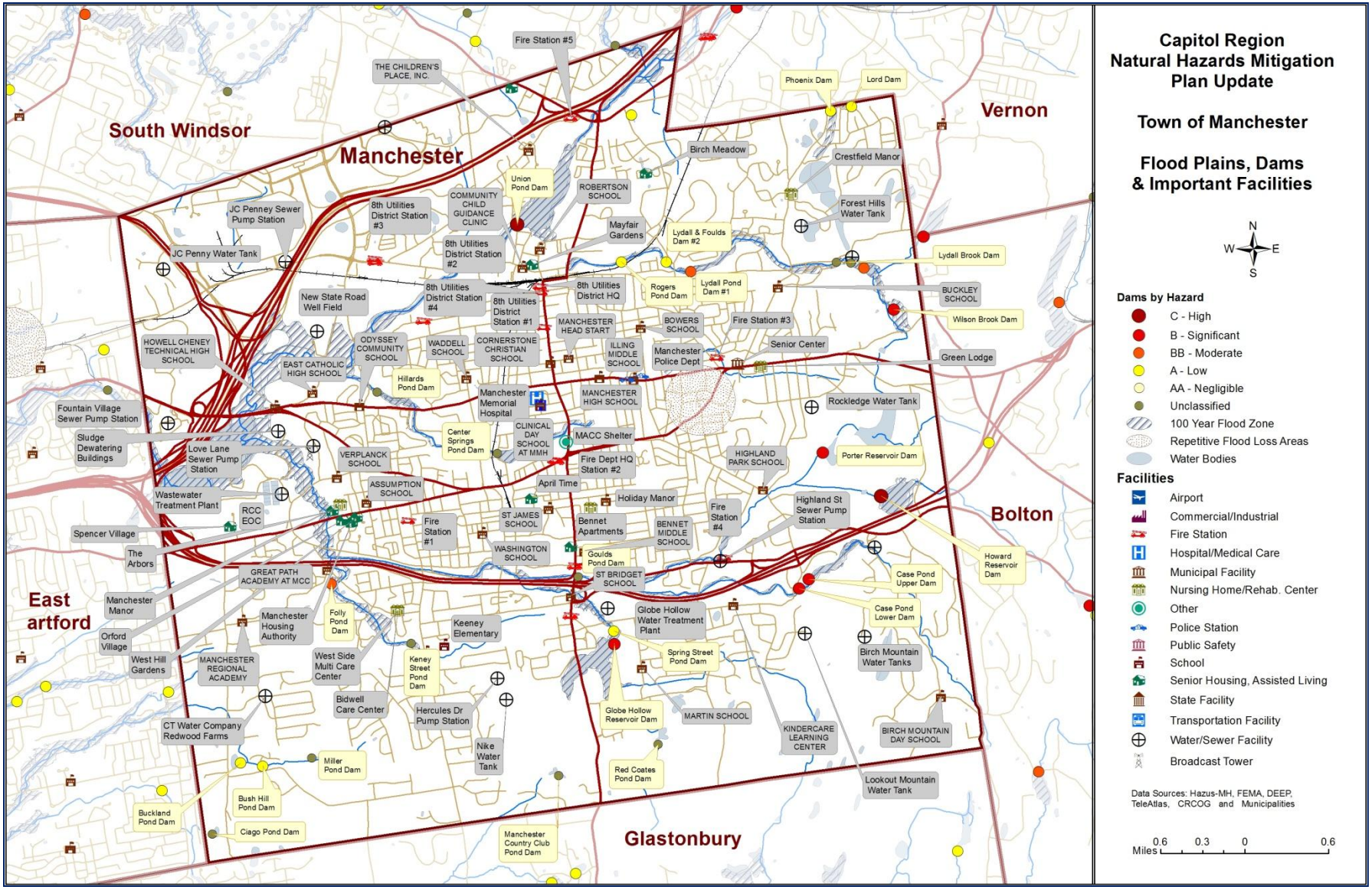
3.1 Continue to update identified private properties including businesses, food service establishments, daycares and group homes served by private wells and/or on-site septic systems located within known flood risks.
Lead: Health, Environmental Health Services, GIS staff
Priority: High
Status: This is an established practice; regular monitoring will continue
Potential Funding Source: General funds
Timeframe: 2014-2019

3.2 Implement an educational program for private owners including materials and recommendations for appropriate remediation of private utilities that have been subjected to flooding, for health protection and promotion.
Lead: Health, Environmental Health Services
Priority: Medium
Status: This is an established practice; regular updates to be program are made
Potential Funding Source: General funds
Timeframe: 2014-2019: it is anticipated outreach will be made on a yearly basis.

Map 40: Manchester Population Density, Dams and Flood Zones



Map 41: Manchester Flood Plains, Repetitive Loss Areas, Dams and Important Facilities



Marlborough

Marlborough is a rural community in Hartford County covering a land area of 23.3 square miles and with an estimated population of 6,410. Elevation ranges from about 160 to 800 feet. The Town is located in the Salmon River Watershed. The Blackledge River, Dickinson Creek, and Fawn and Lyman Brooks are the principal watercourses in Marlborough. The 83 acre spring fed Lake Terramuggus is located in the center of Town. State routes 2 and 66 intersect in Town. As a chiefly residential community, local businesses are the predominant industry. According to the Town's Plan of Conservation and Development, one-third of Marlborough's land area is protected forest land. Continued protection of the Town's natural resources is a focus of the Town's Plan.

Challenges

Storm damage to trees resulting in road blockages, power outages and debris accumulation is a concern for the town. Because the Town has large tracts of forested land, wildfire is another concern.

CRCOG used FEMA's Hazus-MH model to analyze the risks that the Town of Marlborough might face from a hurricane as powerful as the 1938 hurricane. The model estimates that economic losses to the town including residential and commercial damage and business interruptions due to such a Category 3 hurricane would be nearly $30 million. The impacts of such a storm are summarized below:

Estimated Damages from a 1938 Strength Hurricane	Households Displaced	2
	People Needing Shelter	0
	Buildings at Least Moderately Damaged	228
	Buildings Completely Damaged	13
	Total Estimated Economic Losses	$29,657,000
	Total Residential Building Losses	$24,955,000
	Total Commercial, Industrial & Other Building & Content Losses	$2,213,000
	Total Business Interruption Losses	$2,489,000
	Total Debris Generated	45,503 tons
	Truckloads (at 25 tons/truck) of building debris	90

According to information from the Connecticut Department of Emergency Management and Homeland Security, the three federally declared natural disasters of 2011 resulted in total expenses to the municipality of nearly $160,000. These expenses include debris and snow removal, emergency protective measures and repairs to damaged infrastructure and buildings but do not include damages experienced by private citizens and businesses.

2011 Disasters Damage Amounts Eligible for 75% Reimbursement Under FEMA Public Assistance Program				
Applicant: Municipality	**100% of Amount Eligible for 75% Reimbursement**			**Total Damages Eligible for Public Assistance Due to 2011 Disasters**
	DR-1958-CT 2011 Snow	**DR-4023-CT Irene- August 2011**	**DR-4046-CT Severe Weather Oct 2011 (Alfred)**	
Town of Marlborough	**$50,074.99**	**$31,387.47**	**$78,128.83**	**$159,591.29**

The National Flood Insurance Program has paid eight property damage claims in Marlborough totaling over $46,647 to-date. The NFIP paid a total of $6,400 on two claims on one repetitive loss property to-date. No new construction or demolition has occurred in the floodplains since the adoption of the 2008 Plan. Although flooding is not as large a concern in Marlborough as in some other communities, a significant flood event could result in much damage. CRCOG used FEMA's Hazus-MH model to analyze the risks that the Town of Marlborough might face from flooding. The model estimates that economic losses to the town including residential and commercial damage and business interruptions due to a flood having a 1% chance of occurring any given year (the 100-year flood) would be over $5 million. The impacts of such a flood are summarized below:

Estimated Damages from 100-Year Flood	Households Displaced	57
	People Needing Shelter	30
	Buildings at Least Moderately Damaged	2
	Total Estimated Economic Losses	$5,170,000
	Total Residential Building & Content Losses	$3,450,000
	Total Commercial, Industrial & Other Building & Content Losses	$1,720,000
	Total Business Interruption Losses	$0.00

Goals, Objectives and Strategies

GOAL: ENSURE CAPACITY OF TOWN TO REMOVE SNOW

Objective 1:
Maintain an adequate fleet of trucks and equipment, and staff.

Strategic Actions:

1.1 Fund and perform routine maintenance on and replacement of public works fleet.
Lead: Public Works, Administration
Priority: High
Status: Purchased three dump trucks through bonding during last five years. It is recommended this strategic action be retained in Plan Update to address needs for additional equipment and vehicles. Acquisitions to be made according to the Vehicle Replacement Plan and subject to available funding.
Potential Funding Sources: Surplus funding, sale of existing equipment, bonding, lease purchase, military surplus
Timeframe: 2014-2019

1.2 Fund adequate staff and private labor.
Lead: Public Works, Administration
Priority: Medium
Status: Maintained staffing levels over past five years during economic downturn. It is recommended this strategic action be retained in Plan Update.
Potential Funding Sources: General Budget
Timeframe: 2014-2019: Annually through budget process

GOAL: REDUCE POWER OUTAGES AND ENSURE SAFETY OF PROPERTY AND LIFE AS A RESULT OF NATURAL HAZARDS

(Note: This goal was stated as "Reduce power outages as a result of natural hazards" in the 2008 Plan.)

Objective 1:

Establish effective tree maintenance program for town right-of-way.

Strategic Actions:

1.1 Fund and institute routine maintenance of trees in town right-of-way either through town staff or private contractor.

Lead: Public Works, Administration
Priority: Medium
Status: Doubled General Budget for this effort from $5,000 to $10,000. It is recommended this strategic action be retained in Plan Update.
Potential Funding Sources: General Budget
Timeframe: 2014-2019: Annually through budget process

1.2 Investigate opportunities for cost savings through sharing tree maintenance services with neighboring communities through CRCOG service sharing initiatives or otherwise.

Lead: Public Works, Administration
Priority: Medium
Status: Deferred. It is recommended this strategic action be retained in Plan Update. Options will be explored within next five years.
Potential Funding Sources: General Budget
Timeframe: 2014-2019

1.3 Monitor utility right-of-way maintenance.

Lead: Public Works, Public Safety
Priority: Medium
Status: Developed better working relationship with CL&P over past five years through CL&P Liaison Program. It is recommended this strategic action be retained in Plan Update.
Potential Funding Sources: General Budget
Timeframe: 2014-2019: periodic and before expected events.

Objective 2:

Ensure access to power for residents in emergency situations.

Strategic Actions:

2.1 Pursue opportunities, through CREPC and otherwise, to obtain a generator for the Town Hall Emergency Operations Center.

Lead: Emergency Management
Priority: High
Status: In the 2008 Plan, this action was identified as "Pursue opportunities, through CREPC and otherwise, to obtain generators for shelters." That activity is

deferred. However, Town is seeking a FEMA grant currently for a generator for Emergency Operation Center in Town Hall. It is recommended this strategic action be revised in Plan Update to address need for a generator for Emergency Operation Center in Town Hall. The project will be undertaken upon availability of funding.

Potential Funding Sources: Grants.

Timeframe: 2014-2015

2.2 Educate residents on emergency preparedness and services available in the event of an emergency through town website, print media and other means.

Lead: Emergency Management, Public Safety

Priority: Medium

Status: Town has had several outreach efforts over past five years including seasonal and pre-event website and Everbridge updates; annual notices to sewer users regarding need to pump out grinder sewers; post event outreach to grinder pump users; distribution of emergency preparation booklets through school children and inclusion of a notice about the CT Alert system and Get Ready Capitol Region website in the July 2012 tax bill mailing. It is recommended this strategic action be retained in Plan Update.

Potential Funding Sources: General Budget

Timeframe: 2014-2019: Seasonally and before expected storms.

THE FOLLOWING ADDITIONAL GOAL, OBJECTIVES AND MITIGATION ACTIONS ARE PROPOSED FOR THE 2014-2019 PLAN UPDATE:

GOAL: EXPAND CAPACITY OF THE COMMUNITY TO DEAL WITH NATURAL DISASTERS

Objective 1:

Develop programs to educate and involve residents

Strategic Action:

1.1 Establish a local CERT team.

Lead: Emergency Management, Administration

Priority: Medium

Potential Funding Sources: General Budget / EMPG Grant

Timeframe: 2014-2015: Within one to two years

1.2 Expand citizen volunteers available to manage the town shelter

Lead: Emergency Management / CERT Team / Administration

Priority: Low

Potential Funding Sources: General Budget

Timeframe: 2014-2019: Periodically

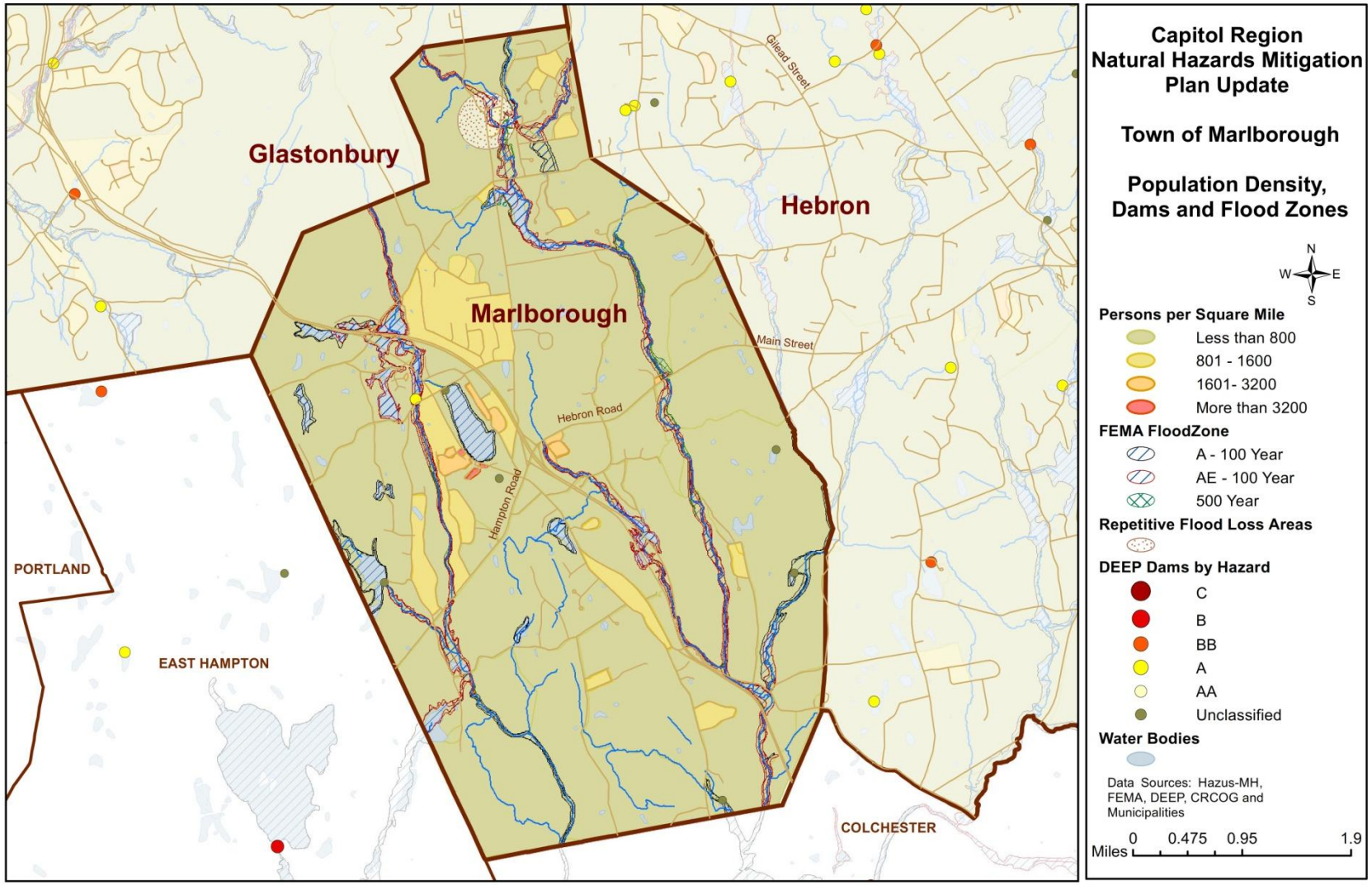
1.3 Expand citizen registration in Marlborough Alerts/Everbridge Program
Lead: Emergency Management, Administration
Priority: High
Potential Funding Sources: General Budget
Timeframe: 2014-2019: Upcoming year and periodically thereafter

Objective 2:
Undertake studies and analyses to assess risks.

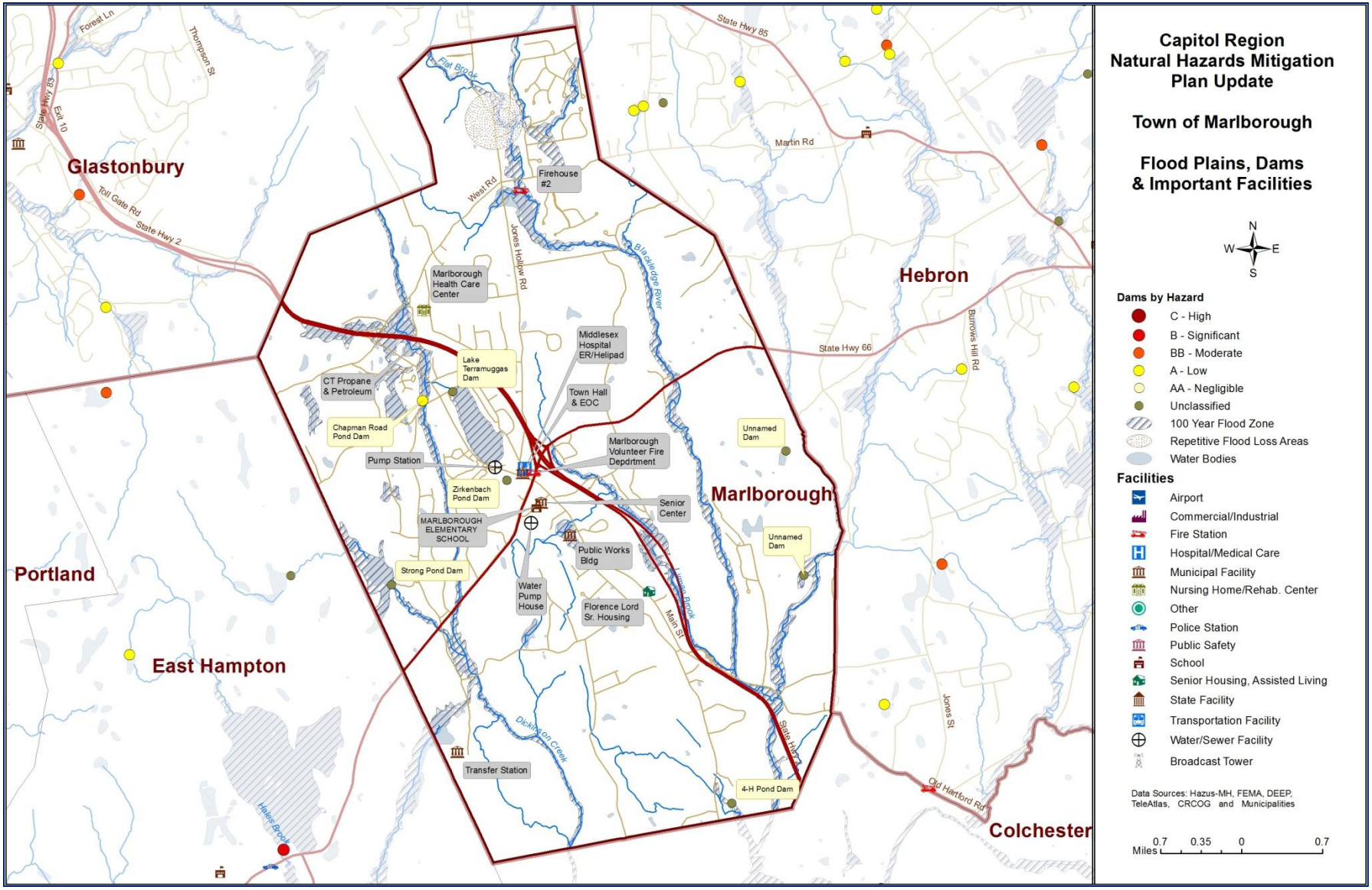
Strategic Action:

2.1 Prepare a forest fire suppression study.
Lead: Planning & Development, Marlborough Volunteer Fire Department, Public Works
Priority: Low
Potential Funding Sources: Grants and General Budget
Timeframe: 2014-2019

Map 42: Population Density, Dams and Flood Zones



Map 43: Marlborough Flood Plains, Repetitive Loss Areas, Dams and Important Facilities



Newington

Newington is a fully suburban town in central Connecticut with a population of about 30,562. The Town encompasses 13.2 square miles and ranges in elevation from 40-350 feet above sea level. The northern section of Newington lies in the Park River Watershed, while the southern section is within the Mattabesset River watershed. The principal watercourses in Town include the Mill, Piper, Rockhole and Webster Brooks. Many state highways run through Newington, including the limited access Route 9, and the Berlin Turnpike (Routes 5/15). Major industries in Newington include printing and manufacturing of airplane parts, dies, gauges, tools and plumbing supplies, as well as significant retail development along the Berlin Turnpike. Newington also houses the Veterans Administration's Connecticut Health Primary Care Facility, the Connecticut Department of Transportation and the Connecticut International Skating Center. The town has recently experienced the development of three major residential complexes; Newington Ridge, Waverley Drive, and Woodland Estates. In addition, there are various elderly housing campuses around town; Cedar Village, Kelliher Park, Millbrook Village, and the newly developed New Meadow Village.

Challenges

The Town has not permitted any new structures in the 100 year flood zone since the adoption of the 2008 Plan and thus has not increased its vulnerability to flooding. Nonetheless, flooding is a major concern for Newington. The National Flood Insurance Program has paid 43 property damage claims in Newington totaling nearly $665,000 to-date. There have been 17 Repetitive Loss Property claims on five properties totaling over $643,000. A significant flood event could result in much damage. CRCOG used FEMA's Hazus-MH model to analyze the risks that the community might face from a major flood. The model estimates that economic losses to the town including residential and commercial damage and business interruptions due to a flood having a 1% chance of occurring any given year (the 100-year flood) would be nearly $16 million. The impacts of such a flood are summarized below:

Estimated Damages from 100-Year Flood	Households Displaced	144
	People Needing Shelter	283
	Buildings at Least Moderately Damaged	23
	Total Estimated Economic Losses	$15,730,000
	Total Residential Building & Content Losses	$4,690,000
	Total Commercial, Industrial & Other Building & Content Losses	$8,930,000
	Total Business Interruption Losses	$70,000

The Town frequently experiences flooding in the Stamm Road area, which encompasses an industrial area and the Amtrak rail line. In fact, the Town contracted the Natural Resources Conservation Service to conduct a study of flood reduction alternatives for the area due to concern for the safety of residents, property owners, and Amtrak riders in light of recent flooding events. The existing flood insurance study did not factor in the potential for failures of the railroad embankment, which occur relatively frequently, therefore, a study using a more realistic flood model was needed. The NRCS study, completed in 2004, documents the flooding problems in this area and reviews several mitigation strategies. The report recommends removing the railroad spur line culvert, replacing existing culverts with box culverts sized to the 100-year flow level along the rail line, and installing various flood proofing measures for eight buildings on Stamm Rd. and Liberty St. The replacement of culverts would reduce the cost of flood

proofing measures. In addition, minor flooding conditions continue to be a problem in the following areas; at the intersection of Main and Dowd and Main and Harding, in the area of Mill Brook.

To implement the recommendations of the 2004 NRCS study would require cooperation from Amtrak, as rail service would have to be suspended while tracks are removed and replaced. Given the amount of planned activity in this area, including the Hartford-New Britain Busway, New Haven-Springfield commuter rail service and plans for the Central CT State University campus, the risks for damages to property and life appear likely to increase. Therefore, the implementation of the NRCS flood reduction recommendations is a top priority although it will require the cooperation of multiple agencies, (Town, State, and Federal), and other regulating authorities and neighboring towns.

In addition to flooding, the Town is also concerned with hurricanes and severe storms. Recently, the town has added the use of the Everbridge Notification System, providing the ability to target the whole town or selected areas.

CRCOG also used FEMA's Hazus-MH model to analyze the risks that the Town of Newington might face from a hurricane as powerful as the 1938 hurricane. The model estimates that economic losses to the town including residential and commercial damage and business interruptions due to such a Category 3 hurricane would be almost $169 million. The impacts of such a storm are summarized below:

Estimated Damages from a 1938 Strength Hurricane	Households Displaced	55
	People Needing Shelter	7
	Buildings at Least Moderately Damaged	1,340
	Buildings Completely Damaged	90
	Total Estimated Economic Losses	$168,800,000
	Total Residential Building Losses	$119,715,000
	Total Commercial, Industrial & Other Building Losses	$30,630,000
	Total Business Interruption Losses	$18,415,000
	Total Debris Generated	30,900 tons
	Truckloads (at 25 tons/truck) of building debris	616

According to information from the Connecticut Department of Emergency Management and Homeland Security, the three federally declared natural disasters of 2011 resulted in total expenses to the municipality and other local agencies of over $2 million. These expenses include debris and snow removal, emergency protective measures and repairs to damaged infrastructure and buildings but do not include damages experienced by private citizens and businesses.

2011 Disasters Damage Amounts Eligible for 75% Reimbursement Under FEMA Public Assistance Program				
Applicant: Municipality	**100% of Amount Eligible for 75% Reimbursement**			**Total Damages Eligible for Public Assistance Due to 2011 Disasters**
	DR-1958-CT 2011 Snow	**DR-4023-CT Irene August 2011**	**DR-4046-CT Severe Weather Oct 2011 Alfred)**	
Town of Newington	**$65,803.73**	**$140,941.77**	**$1,975,847.48**	**$2,182,592.98**

Goals, Objectives and Strategies

GOAL: REDUCE THE LOSS OF LIFE AND PROPERTY AND ECONOMIC CONSEQUENCES AS A RESULT OF FLOODING, HIGH WINDS AND SEVERE WINTER STORMS

Objective 1:
Reduce the likelihood of flooding by improving existing natural and artificial drainage systems.

Strategic Actions:

1.1 Coordinate with Central CT State University, Amtrak, CT Department of Transportation and Northeast Utilities to implement recommendations of the NRCS study of Piper Brook/Stamm Road area and\or explore other alternatives (design initiatives) to ameliorate the flooding.
Lead: Highway, Engineering
Priority: High
Status: This is an established practice. Town will review and continue correspondence with the State.
Potential Funding Source: C.I.P., State and Federal Grants
Timeframe: 2014-2019

1.2 Ensure that Amtrak properly maintains existing drainage system around rail bed.
Lead: Highway
Priority: Medium
Status: This is an established practice.
Potential Funding Source: Amtrak
Timeframe: 2014-2019

1.3 Ensure Town properly maintains its drainage facilities near Stamm Road/Piper Brook complex.
Lead: Highway
Priority: Medium
Status: This is an established practice.
Potential Funding Source: C.I.P., General Fund
Timeframe: 2014-2019

1.4 Notify Wilbur Smith, who is conducting the New Haven-Springfield commuter rail study, of town's flooding and rail safety concerns, and of NRCS study's recommendations.
Lead: Town Planner
Priority: High
Status: Completed. The NHHS rail project Environmental Assessment addresses the need to repair/replace the Piper Brook and Webster Brook stream crossings. (For the Plan Update, this strategic action will be replaced by the broader action below.)

1.5 Reduce the likelihood of flooding by improving existing natural and artificial drainage systems.
Lead: Town Planner
Priority: High

Status: This is a new Initiative for this Plan Update, however, efforts are underway. In 2013, the Town established a Low Impact Development and Stormwater Manual and in March 2014, the Zoning Regulations were revised to require use of low impact development techniques. Efforts will continue through the development review process.
Potential Funding Source: General Fund
Timeframe: 2014-2019

1.6 Continue to support Metropolitan District Commission efforts to disconnect residential tie-ins to the sewer system. MDC will provide public outreach updates by informational sheets (i.e. flyers) and community meetings.
Lead: Highway
Priority: Medium
Status: This is an established practice.
Potential Funding Source: MDC
Timeframe: 2014-2019: annual updates are expected

Objective 2:
Improve the ability of public works to prepare and respond to severe winter storms and other natural emergencies.

Strategic Actions:

2.1 Plan and implement enhanced salt road treatment technology, including storage facility construction.
Lead: Highway
Priority: Medium
Status: Completed

2.2 Continue to support CT DOT in state road treatment.
Lead: Highway
Priority: Medium
Status: This is an established practice and will continue on an as needed basis.
Potential Funding Source: general fund, state aid
Timeframe: 2014-2019

Objective 3:
Improve the ability of public works and parks and recreation to prepare and respond to hurricanes/high wind events.

Strategic Action:

3.1 Develop and implement street and public tree maintenance plan.
Lead: Parks & Grounds
Priority: Medium

Status: Efforts have begun to develop this plan
Potential Funding Source: general fund
Timeframe: 2014-2019: completion is expected by the end of 2019.

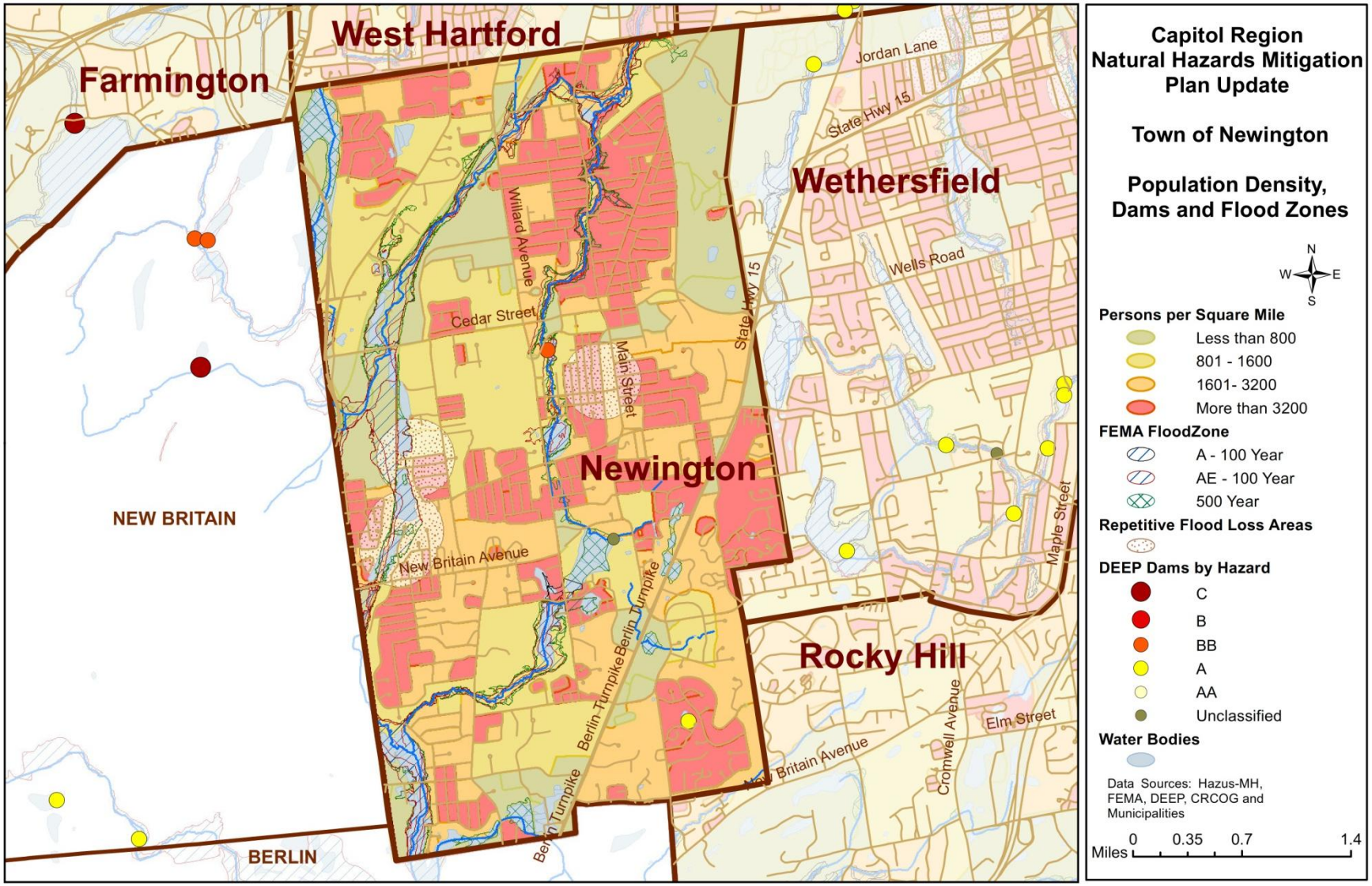
Objective 4:
Ensure ability of municipal departments to respond to emergencies resulting from natural hazards.

Strategic Actions:

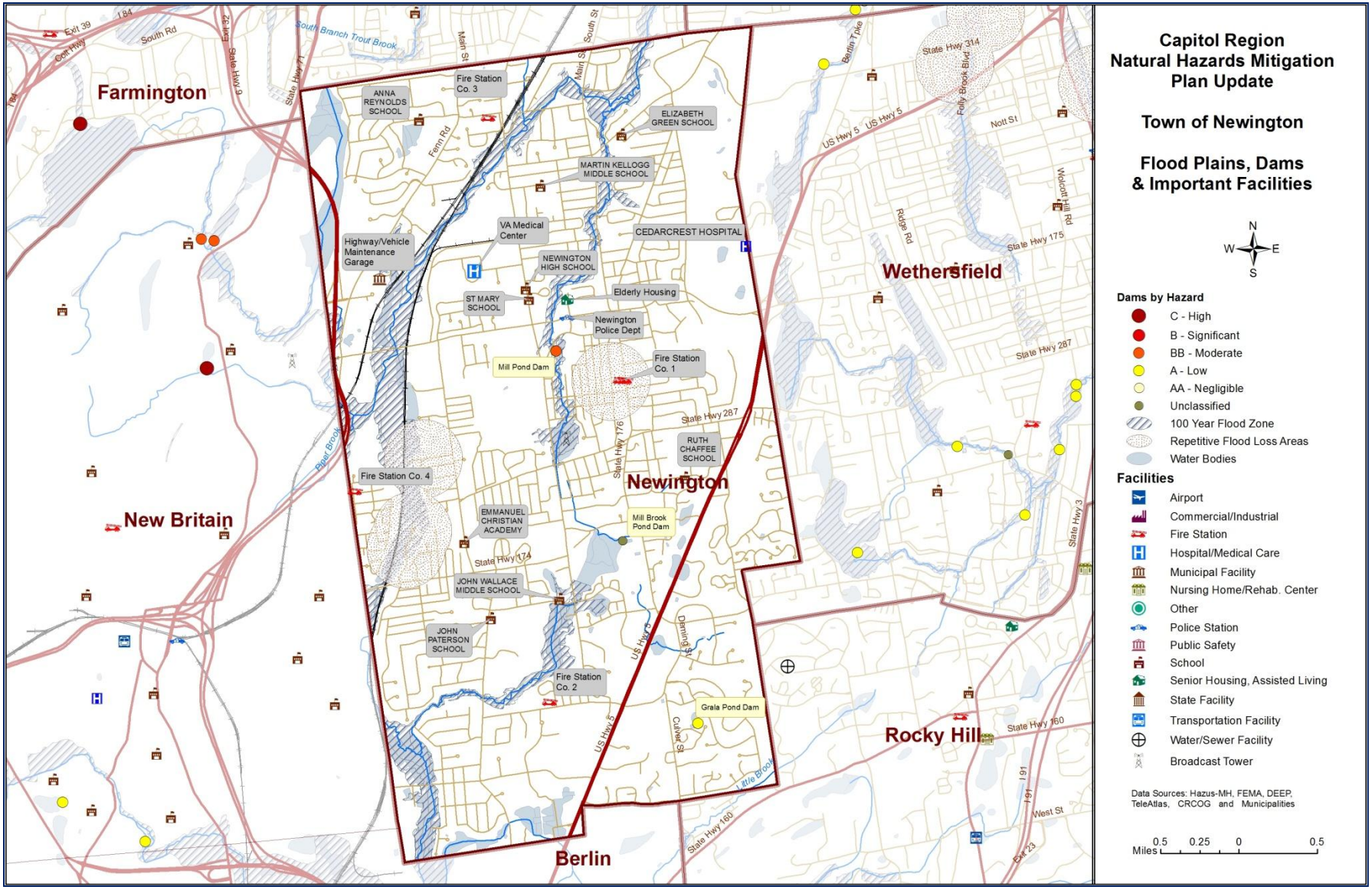
4.1 Continue training through Local Emergency Planning Committee.
Lead: Police, Fire, and other Management personnel
Priority: High
Status: This is an established and sustained practice.
Potential Funding Source: general fund, grants
Timeframe: 2014-2019: annual training is anticipated

4.2 Emergency Operations Center (EOC)
Lead: Town Manager, Fire, Police, and other Management personnel
Priority: High
Status: This is a newly identified initiative; however, efforts are underway to ensure that local officials are familiar with the functions and capabilities of the EOC. The EOC is located in the new Police Station. The operations of the EOC will be maintained through the annual budget process.
Potential Funding Source: general funds
Timeframe: 2014-2019

Map 44: Newington Population Density, Dams and Flood Zones



Map 45: Newington Flood Plains, Repetitive Loss Areas, Dams and Important Facilities



Rocky Hill

Rocky Hill is located in the southern portion of the Capitol Region. Its land area covers 13.9 square miles with an estimated 2010 Census population of 19,703. Elevation in Rocky Hill ranges from approximately 30 feet to 400 feet. Land area drains primarily to the Connecticut River Watershed, although the southwest portion of Town drains to the Mattabesset River Watershed. Aside from the Connecticut River, major watercourses include Dividend, Goff, Hog and Saw Mill Brooks. Principal transportation routes through Rocky Hill include Interstate 91 (with access to two exists), State Route 99 (running north-south located on the east side of Town), State Route 3 (running north-south located on the west side of Town), State Route 160 (running east-west and centrally located) and State Route 400 (running east-west and centrally located). An active freight rail line, owned by Providence-Worchester Railroad, runs north-south through Town along the Connecticut River providing service to one Rocky Hill business on a weekly basis and providing access to regional freight lines throughout New England, New York and Ohio. Paralleling the rail line is the Buckeye Jet Fuel line which runs from New Haven to Bradley International Airport, providing jet fuel to Bradley. The State Veterans Home and Hospital and Dinosaur State Park are among approximately a dozen State agencies located in Town. Rocky Hill's major industries include professional, scientific and technical services, finance and insurance, warehouse/ distribution, health care and construction.

Rocky Hill is professionally managed by a full-time Town Manager. The Police Station serves as the Emergency Operations Center with the Rocky Hill Public Library serving as back-up and a warming/cooling center. The Police Department is comprised of 26 sworn police officers plus the Police Chief, Deputy Police Chief and seven full time emergency dispatch personnel. Fire protection is provided by three volunteer fire stations.

An economic assessment study completed in 2011, projects an additional 1,838,000 square feet of new development potential. Recent completed and approved projects include a 250,000 square foot refrigerated warehouse/distribution facility, 22,000 square feet of new medical buildings, a 142,000 square foot mixed-use retail-restaurant-office project, the redevelopment of the CT Foundry, a Brownfield property located on the Connecticut River, into a residential mixed use development, construction of a 144 unit apartment building, the location of a new pre-k through 5 magnet school and over 22 new businesses.

Challenges

The top three natural hazard mitigation challenges likely to impact Rocky Hill will result from floods, hurricanes/tropical storms and winter storms.

Floods: The Connecticut River forms the Town's eastern border for approximately four miles. The other major watercourses are the Mattabesset River on the west side of Town and Goff Brook, Hog Brook and Saw Mill Brook.

Flood mitigation measures should be addressed to protect the MDC wastewater treatment facility located in the northeast corner of Town in the Connecticut River flood plain. The facility is vulnerable to the 100 year flood event. Additional threats resulting from annual flood events directly along the

Connecticut River are few. Ferry Landing Park and parts of meadow Road become inaccessible during many spring flood events. Access to some of the buildings during some flood stage events is not possible. Advance notification and education are key mitigation measures for these property owners.

When the Mattabesset River floods in Berlin, Saw Mill Brook will flood, rendering the extreme western portion of France Street, the residences located there and the Town the of Berlin inaccessible. Additional areas of concern are Beach Road and Main Street (CT RT 99) in the vicinity of the former Ames property. Beach Road is susceptible to periodic flooding isolating homes north of Little Brook. State Drainage structures located on Main Street (CT 99) are under-sized, causing periodic localized flooding.

The National Flood Insurance Program has paid 10 property damage claims in Rocky Hill totaling over $95,500 to-date. There have been two Repetitive Loss Property claims totaling over $41,400 filed on a single property. To limit future vulnerability to floods, the Town has not permitted any new structures in flood zones, and in 2008, updated the Town Code Chapter 141, Flood Damage Prevention, in accordance with NFIP minimum standards. Nonetheless, a significant flood event could result in much damage. CRCOG used FEMA's Hazus-MH model to analyze the risks that the community might face from a major flood. The model estimates that economic losses to the town including residential and commercial damage and business interruptions due to a flood having a 1% chance of occurring any given year (the 100-year flood) would be nearly $ 5 million. The impacts of such a flood are summarized below:

Estimated Damages from 100-Year Flood	Households Displaced	24
	People Needing Shelter	27
	Buildings at Least Moderately Damaged	1
	Total Estimated Economic Losses	$4,740,000
	Total Residential Building & Content Losses	$1,840,000
	Total Commercial, Industrial & Other Building & Content Losses	$2,900,000
	Total Business Interruption Losses	$0.00

Winter Storms & Hurricanes/Tropical Storms: Rocky Hill emergency response personnel are highly skilled and experienced in emergency response. Emergency response personnel and the Town of Rocky Hill highway employees are crossed trained in snow removal and emergency response for multiple and pre-disaster events.

Snow removal on Town roads is not an issue. However, the State roadways are insufficiently cleared and/or there are significant delays in snow removal, causing complications with snow removal at intersections of Town and State roadways and transportation delays for emergency response personnel and Town plow crews. Specialized snow removal equipment, such as for clearing sidewalks and restricted access areas, would greatly assist with mobilization efforts in and around staging areas and at designated public buildings.

Maintaining access to the Town's fire hydrants is always an issue during heavy snow events. A Town Ordinance requiring residents to clear hydrants in front of their properties, as well as public notification reminders, help to address this issue.

Heavy snow and high winds associated with winter storms and hurricanes/tropical storms bring the risk of power failures. A primary concern is to maintain power at the Town's EOC/Police Station, the Town Community Center/Town Hall (shelter) and the Library, which is utilized as a back-up shelter during power outages. The existing generator for the Police Station/EOC is older than 20 years and requires replacement the generator for the Library is in need of up-grading. The High School and West Hill School are appropriately located to be utilized as shelters.

Power restoration sequencing is important. The Town, in cooperation with CL&P, has designated Century Hills Apartments as a first priority restoration area due to a high concentration of apartment and a large Asian Indian population. The second priority for power restoration is senior and over 55 adult housing developments.

CRCOG also used FEMA's Hazus-MH model to analyze the risks that the Town of Rocky Hill might face from a hurricane as powerful as the 1938 hurricane. The model estimates that economic losses to the town including residential and commercial damage and business interruptions due to such a Category 3 hurricane would be over $155 million. The impacts of such a storm are summarized below:

Estimated Damages from a 1938 Strength Hurricane	Households Displaced	138
	People Needing Shelter	25
	Buildings at Least Moderately Damaged	827
	Buildings Completely Damaged	47
	Total Estimated Economic Losses	$115,185,000
	Total Residential Building Losses	$80,688,000
	Total Commercial, Industrial & Other Building Losses	$21,190,000
	Total Business Interruption Losses	$13,307,000
	Total Debris Generated	28,622 tons
	Truckloads (at 25 tons/truck) of building debris	463

According to information from the Connecticut Department of Emergency Management and Homeland Security, the three federally declared natural disasters of 2011 resulted in total expenses to the municipality and other local agencies of over $1 million. These expenses include debris and snow removal, emergency protective measures and repairs to damaged infrastructure and buildings but do not include damages experienced by private citizens and businesses.

2011 Disasters Damage Amounts Eligible for 75% Reimbursement Under FEMA Public Assistance Program				
Applicant: Municipality	**100% of Amount Eligible for 75% Reimbursement**			**Total Damages Eligible for Public Assistance Due to 2011 Disasters**
	DR-1958-CT 2011 Snow	**DR-4023-CT Irene August 2011**	**DR-4046-CT Severe Weather Oct 2011 -Alfred**	
Town of Rocky Hill	**$113,168.33**	**$257,069.39**	**$690,662.55**	**$1,060,900.27**

Goals, Objectives and Strategies

The Town reassessed its goal, objective and mitigation actions identified in the 2008 Plan. The Town's 2008 goal of "Reducing the risk of loss of life and property as a result of natural disasters," was restated to specifically identify flooding, winter storms and hurricanes/tropical storms. A number of new objectives and associated mitigation actions were proposed. Also, some mitigation actions from the 2008 Plan were modified to recognize work accomplished or changes in priorities.

GOAL: REDUCE THE RISK OF LOSS OF LIFE AND PROPERTY AS A RESULT OF FLOODING, WINTER STORMS AND HURRICANES/TROPICAL STORMS.

Objective 1:
Improve the ability of the Town to provide emergency sheltering for at least 5,000 residents.

Strategic Actions:

1.1 Supply new generators and appropriate fuel for The EOC/Police Station, the Library, the High School and West Hill School to be used as emergency shelters.
Lead: Administration, Emergency Management
Priority: High (raised from Medium in 2008 Plan)
Status: Grant application submitted. The need for generators at the EOC/Police Station and Library is now recognized in addition to the need for generators at the schools.
Potential Funding Source: FEMA
Timeframe: Completion anticipated by end of FY 2013-14

1.2 Prepare plans to identify a potential site for a warehouse facility for storage of emergency sheltering resources as State/Federal funding becomes available.
Lead: Emergency Management, Planning & Zoning
Priority: High (raised from Medium in 2008 Plan)
Status: Preliminary planning is underway to identify a potential site
Potential Funding Source: General Fund, grants
Timeframe: Completion anticipated by end of FY 2013-14.

1.3 Continue to replenish sheltering supplies (cots, water, food, etc.) as expiration dates warrant.
Lead: Emergency Management
Priority: Medium
Status: Current practice; continue as needed. Replenishments will be made dependent upon expiration dates of stocks.
Potential Funding Source: General Fund, grants
Timeframe: FY 2013-18

1.4 Seek funding sources for purchase of shelter supplies
Lead: Emergency Management, Administration
Priority: Medium
Status: Current practice; continue as needed
Potential Funding Source: FEMA, General Fund
Timeframe: Annually during FY 2013-18

1.5 Ensure and supply transportation access to emergency shelters.
Lead: Emergency Management
Priority: High
Status: This is a current practice. The Town has dedicated three vehicles to this purpose which is addressed in the emergency operation procedures.
Potential Funding Source: General Fund
Timeframe: FY 2013-18

Objective 2:
Provide access for police, fire and other emergency response personnel to the roadway system, to fire hydrants and to sidewalks a timely manner during and after storm events.
(Note: This is a newly identified objective for the 2014-2019 Plan Update.)

Strategic Actions:

2.1 Work with the State DOT towards better coordination and quicker State response to clear State Roads
Lead: Town Administration, Highway
Priority: High
Status: This is a new Initiative which was begun in August 2013. Efforts will continue throughout the plan period.
Potential Funding Source: General Fund
Timeframe: 2014-2019

2.2 Acquire specialized snow removal equipment
Lead: Highway
Priority: High
Status: This is a new Initiative.
Potential Funding Source: FEMA
Timeframe: Completion is anticipated by end of FY 2013-14

2.3 Continue enforcement of fire hydrant and sidewalk clearing ordinance
Lead: Police
Priority: High
Status: Although this is a new Initiative for the Plan Update, this is an current practice of the Town.
Potential Funding Source: General Fund
Timeframe: 2014-2019: following snow storms

Objective 3:
Restore power loss due to storm events in an expeditious manner and to targeted priority areas through improved emergency response coordination with utility companies
(Note: This is a newly identified objective for the 2014-2019 Plan Update.)

Strategic Actions:

3.1 Continue to work with and improve coordination with utility companies to provide first order power restoration to Century Hills, senior housing, age restricted developments and assisted living developments.
Lead: Administration, Emergency Management, Engineering
Priority: High
Status: Although this is a new Initiative for the Plan Update, this is an established practice of the Town. The Town has coordinated with NU to implement a staging plan for power restoration
Potential Funding Source: General fund
Timeframe: 2014-2019

3.2 Hold meetings on a regular basis to plan and coordinate natural hazard mitigation and coordinated disaster response.
Lead: Emergency Management, Administration
Priority: Medium
Status: This initiative builds on existing efforts to coordinate with the MDC and with CL&P through its municipal liaison program.
Potential Funding Source: General fund, Utilities
Timeframe: 2014-2019: Quarterly or as required (Emergency response personnel meet quarterly with MDC.)

Objective 4:
Reduce the likelihood of flooding by improving existing natural and artificial drainage systems.

Status Update: In the 2008 Plan, the Town identified two drainage improvement projects which have been completed. These are the Belden Brook piping project and improvements in the Terry Lane/Elm Ridge Park area.

Strategic Actions:

4.1 Improve the drainage on Beach Road by installing a box culvert raising the road above the flood elevation. Currently periodic flooding occurs isolating the homes north of the Little Brook.
Lead: Engineering
Priority: Medium
Status: This is a new initiative
Potential Funding Source: LOCIP-Town Roads
Timeframe: FY 2016-18

4.2 Improve the end of France Street to provide a two lane road meeting current design standards. Outer France Street becomes impassable during times of flooding due to flood waters over the road from the Sawmill Brook in Rocky Hill and Mattabesset River in Berlin. Rocky Hill residents have no access to or from the west and are forced to use a one lane road with limited visibility.
Lead: Engineering
Priority: Medium
Status: This is a new Initiative
Potential Funding Source: LOCIP-Town Roads, FEMA
Timeframe: FY 2018-2019

4.3 Continue municipal education and fine program to disconnect residential sump pumps from sewage system.
Lead: Public Works, Administration
Priority: Medium
Status: The 2008 Plan proposed the establishment of a municipal education program; this program has been implemented along with an associated fine program. The Town will continue these efforts.
Potential Funding Source: Operating Budget
Timeframe: 2014-2019: annual educational outreach is anticipated.

4.4 Continue to support MDC's Clean Water project
Lead: Administration
Priority: Medium
Status: Although this is a new Initiative for the Plan Update, this is an established practice of the Town.
Potential Funding Source: Operating Budget
Timeframe: 2014-2018

Objective 5:
Implement flood mitigation measures to protect the MDC wastewater treatment facility located in the northeast corner of Town.
(Note: This is a newly identified objective for the 2014-2019Plan Update.)

Strategic Action:

5.1 Work with the MDC towards implementation of flood protection measures.
Lead: Town Administration, Emergency Management
Priority: Medium
Status: This is a new initiative.
Potential Funding Source: Operating Budget
Timeframe: FY 2014 - As required

Objective 6:
Mitigate flood loss/damage during flood events within the Connecticut River flood plain.
(Note: This is a newly identified objective for the 2014-2019 Plan Update.)

Strategic Actions:

6.1 Continue with advanced notification and education of impacted property owners.
Lead: Administration, Emergency Management
Priority: High
Status: Although this is a new Initiative for the Plan Update, this is an established practice of the Town.
Potential Funding Source: Operating Budget
Timeframe: 2014-2019: in advance of storms; annual educational outreach efforts are anticipated

6.2 Continue implementation and enforcement of the Town's Flood Damage Prevention Ordinance and the Flood Overlay District Zoning Regulation.
Lead: Planning & Zoning
Priority: High
Status: Although this is a new Initiative for the Plan Update, this is an established practice of the Town. Efforts will continue as development reviews, inspections and enforcement are undertaken.
Potential Funding Source: Operating Budget
Timeframe: 2014-2019

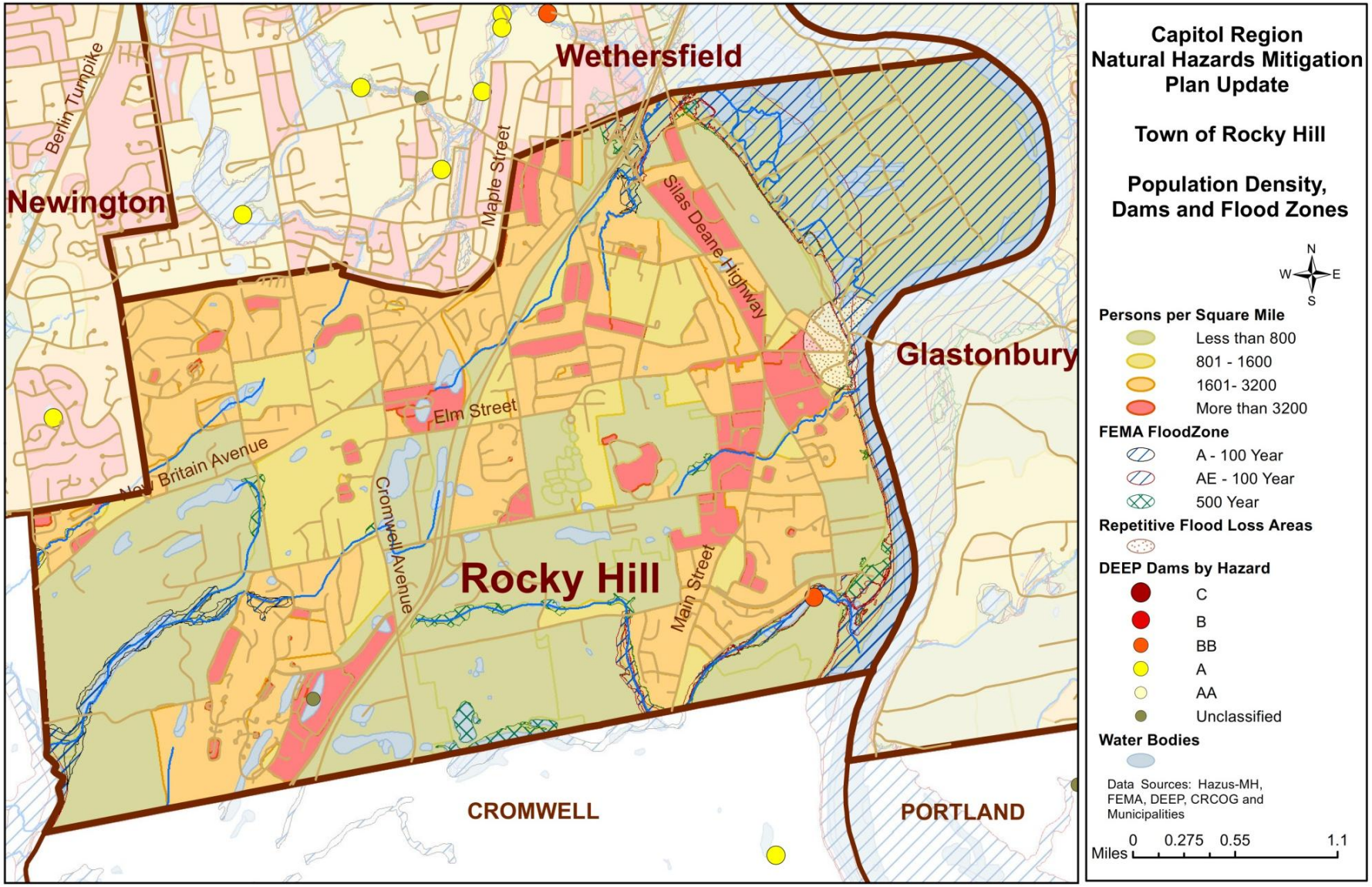
6.3 Acquire targeted properties as State/Federal funding becomes available
Lead: Engineering
Priority: Low
Status: This is a new initiative.
Potential Funding Source: FEMA, other federal grants and state aid
Timeframe: 2015-2019

Objective 7:
Improve emergency response coordination with utility companies and the Towns of Berlin, Newington, Wethersfield and Cromwell.
(Note: This is a revised objective for the 2014-2019 Plan Update.)

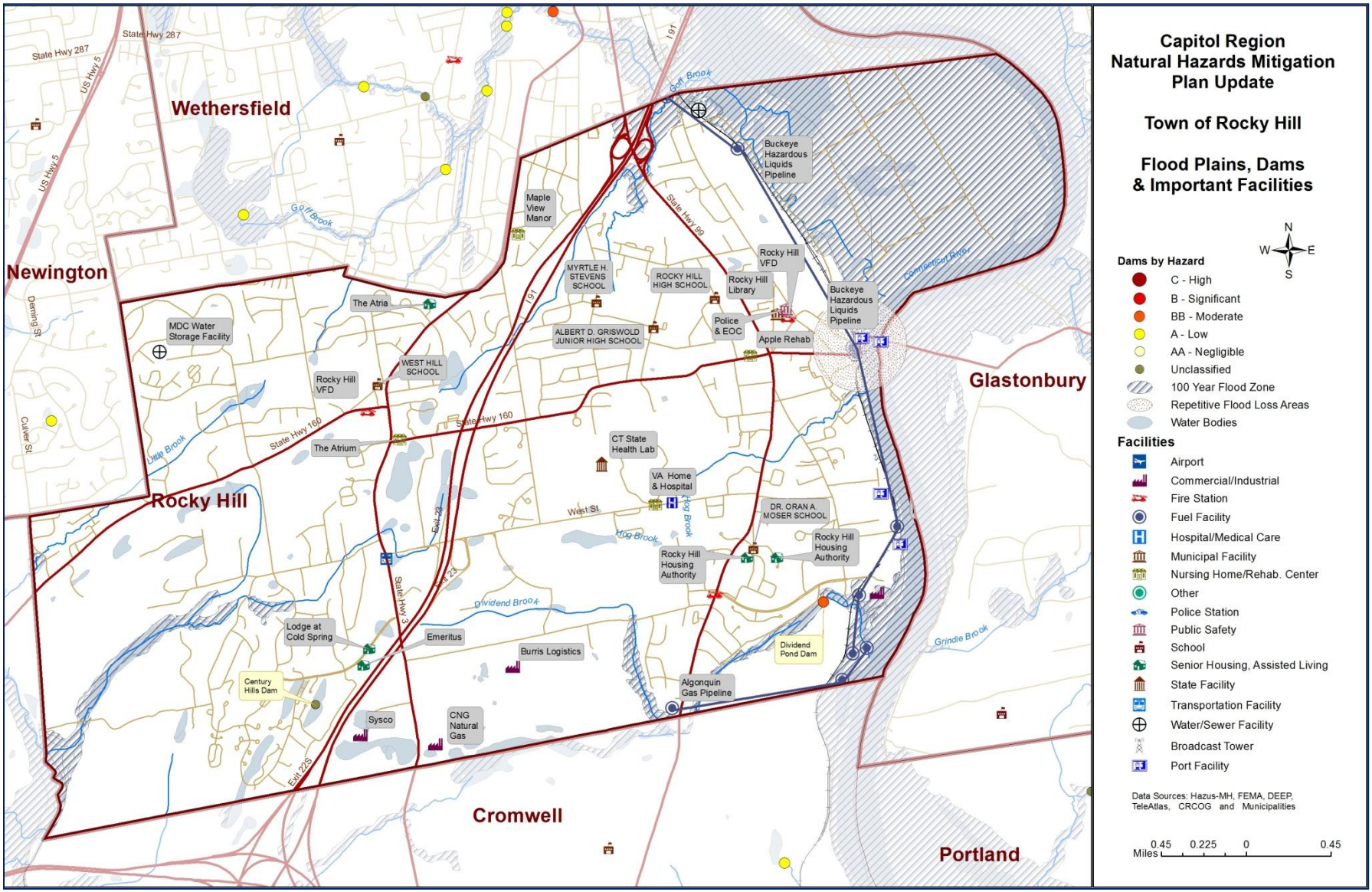
Strategic Action:

7.1 Hold meetings on a regular basis to plan and coordinate natural hazard mitigation and coordinated disaster response.
Lead: Administration, Emergency Management, Highways, Engineering
Priority: High
Status: This is a revised initiative which expands on current strategy of meeting with utility companies. Emergency response personnel currently meet quarterly with MDC.
Potential Funding Source: Operating Budget
Timeframe: 2014-2019: Quarterly or as required

Map 46: Rocky Hill Population Density, Dams and Flood Zones



Map 47: Rocky Hill Flood Plains, Repetitive Loss Areas, Dams and Important Facilities



Simsbury

Simsbury is a suburban community of about 23,600 located in the western portion of the Capitol Region. Its land area encompasses 33.9 square miles. Elevation in town generally ranges from about 150 to 500 feet above sea level. Most of Simsbury contributes to the Farmington River Watershed, although a very small portion in the southeast drains to the Park River Watershed. Watercourses in town include the Farmington River and Bissell, Grimes, Hop, King Philip, Nod, Minister, Munnisunk, Owens, Saxton, Second, and Still Brooks. Principal industries include agriculture, insurance offices, non-electric blast initiation systems, polypropylene fiber manufacturing, and safety and detonating fuse making. The main transportation routes through town are north-south state routes 10/202 and 167, and east-west state routes 185, 309 and 315.

Challenges

While Simsbury has been pro-active in assuring that new land-use developments are not placed in floodplains or wetlands, and the Town has worked to preserve open space in the floodplain, flooding is a significant challenge for Simsbury. The Town has several areas of repetitive loses involving at least eleven properties and resulting in claims of over $389,000. Overall, the National Flood Insurance Program (NFIP) has paid 100 claims in Simsbury totaling over $526,615 to-date. For homes with repetitive loses, the Town is utilizing the Everbridge notification system. The Towns Social Services Department maintains a listing of elderly, frail and disabled persons so that notification and contact can be made in flooding and loss of power events. The Town is carefully reviewing renovation/reconstruction plans for homes in repetitive lose areas in order to assure that flood proofing is accomplished and that utility/heating facilities are located above the 100 year flood level.

Also, there are a number of important roads that in recent years have been overtopped by flood waters, with resulting limitations to travel by emergency vehicles and access to the Town's Emergency Shelter. In two flood events (Hurricane Irene and Storm Sandy), certain critical access roads were blocked. Route 185 was closed at East Weatogue Street, severing a major east/west transportation artery. Route 315 was closed, isolating the Tariffville Village area and preventing those residents access to the Town emergency shelter. Town Forest Road flooding blocked access/egress to the Town Public Works Campus. Riverside Road flooding blocked emergency vehicle access to the neighborhood. Solutions for some of these roads, such as Route 185 and Riverside Road are accomplishable by raising road elevations above the 100 year flood level. However, the environmental and cost implications in raising Route 315, suggest that a secondary emergency shelter site be established at the Tariffville Elementary School. Access improvements on Town Forest Road can be accomplished, but at a large expense. Work involves raising the road above the 100 year flood level and replacing two large culverts and associated drainage.

CRCOG used FEMA's Hazus-MH model to analyze the risks that the Town of Simsbury might face from a major flood. The model estimates that economic losses to the town including residential and commercial damage and business interruptions due to a flood having a 1% chance of occurring any given year (the 100-year flood) would be over $102 million. The impacts of such a flood are summarized below:

Estimated Damages from 100-Year Flood	Households Displaced	347
	People Needing Shelter	604
	Buildings at Least Moderately Damaged	135
	Total Estimated Economic Losses	$102,150,000
	Total Residential Building & Content Losses	$50,940,000
	Total Commercial, Industrial & Other Building & Content Losses	$50,880,000
	Total Business Interruption Losses	$330,000

Losses from strong hurricanes would also be significant. The model estimates that economic losses to the town including residential and commercial damage and business interruptions due to a Category 3 hurricane such as the 1938 Hurricane would be nearly $89 million. The impacts of such a storm are summarized below:

Estimated Damages from a 1938 Strength Hurricane	Households Displaced	11
	People Needing Shelter	1
	Buildings at Least Moderately Damaged	512
	Buildings Completely Damaged	21
	Total Estimated Economic Losses	$88,800,000
	Total Residential Building Losses	$74,170,000
	Total Commercial, Industrial & Other Building Losses	$7,550,000
	Total Business Interruption Losses	$7,070,000
	Total Debris Generated	44,301 tons
	Truckloads (at 25 tons/truck) of building debris	259

According to information from the Connecticut Department of Emergency Management and Homeland Security, the three federally declared natural disasters of 2011 resulted in total expenses to the municipality and other local agencies of over $3.8 million. These expenses include debris and snow removal, emergency protective measures and repairs to damaged infrastructure and buildings but do not include damages experienced by private citizens and businesses. Storm Alfred, by far, wreaked the most havoc on the town. During Storm Alfred, the municipality experienced extreme costs in excess of $3.6 million in order to clear downed trees, operate emergency shelters, and clear roads. Snow storms have been found to be the most costly events, with widespread community impacts. A comprehensive, fully founded, and utility coordinated tree trimming/removal program is urgently needed to address the issue of downed trees from damaging overhead utilities.

2011 Disasters Damage Amounts Eligible for 75% Reimbursement Under FEMA Public Assistance Program				
Applicant: Town & Other Agencies (i.e., Fire Districts, Schools, and Private Non-Profit Agencies)	**100% of Amount Eligible for 75% Reimbursement**			**Total Damages Eligible for Public Assistance Due to 2011 Disasters**
	DR-1958-CT 2011 Snow	**DR-4023-CT Irene August 2011**	**DR-4046-CT Severe Weather Oct 2011 (Alfred)**	
Town of Simsbury	$75,635.26	$60,224.55	$3,557,624.88	$3,693,484.69
Simsbury Other			$107,978.10	$107,978.10
Simsbury Total	**$75,635.26**	**$60,224.55**	**$3,665,602.98**	**$3,801,462.79**

Goals, Objectives and Strategies

GOAL: REDUCE THE POTENTIAL FOR LOSS OF LIFE AND PROPERTY AS A RESULT OF FLOODING

Objective 1:
Incorporate natural hazard mitigation strategies into new/existing projects.

Strategic Actions:
(The following mitigation measures which were identified in the 2008 Plan are proposed to be continued in the 2014-2019 Plan Update)

1.1 Continue to implement regulations prohibiting net flow increase from new development.
Lead: Planning, Engineering
Priority: High
Status: This is an established practice of the Town. As applications for development are received by the Town, they are routinely reviewed for their conformance to flood plain regulations. Town inspectors ensure the developments are constructed in conformance with approved plans and regulations.
Potential Funding Source: General funds
Timeframe: 2014-2019.

1.2 Implement recommended regulations that result from study of impervious coverage in various areas of town.
Lead: Planning, Engineering
Priority: Medium
Status: The Town undertook a low impact development study and developed stormwater design guidelines, a development checklist and proposed regulations in 2011. As development proposals are submitted they will continue to be reviewed in accordance with approved guidelines and regulations.
Potential Funding Source: General funds
Timeframe: 2014-2019

Objective 2:
Correct undersized drainage systems in repetitively flooded areas.

Strategic Actions:

2.1 Upgrade culverts associated with Bissell Brook on Fire Town Road.
Lead: Public Works, Administration
Priority: Medium
Status: This project identified in the 2008 Plan was completed prior to the 2014-2019 Update

2.2 Upgrade culverts associated with Stratton Brook on Town Forest and Stratton Brook Roads.
Lead: Public Works, Administration

Priority: Medium
Status: This project which was identified in the 2008 Plan was not completed and is proposed to be included in the 2014-2019 Plan Update. This work is identified in the Town's Capital Improvements Program.
Potential Funding Sources: Bonding and State Aid
Timeframe: Completion is anticipated by end of 2015

Objective 3:
Ensure the protection of private properties at greatest risk.

Strategic Actions:

3.1 Explore participation in the Community Rating System.
Lead: Emergency Management, Planning
Priority: High
Status: This project which was identified in the 2008 Plan was not completed and is proposed to be included in the 2014-2019 Plan Update
Potential Funding Sources: General funds
Timeframe: 2014-2019

3.2 Pursue acquisition of parcels with potential for development along or within 100-year floodplain to preserve as open space.
Lead: Planning, Administration
Priority: High
Status: This project, identified in the 2008 Plan, was completed prior to the 2014-2019 Plan Update. Connecticut DEEP acquired land in the floodplain on Eno Place adjacent to the Simsbury Game Management Area.

GOAL: REDUCE THE POTENTIAL FOR LOSS OF LIFE AND PROPERTY AS A RESULT OF WINTER STORMS

Objective 1:
Continue to trim/remove hazard trees.

Strategic Actions:

(The following mitigation measures which were identified in the 2008 Plan are proposed to be continued in the 2014-2019 Plan Update)

1.1 Maintain relationship with CL&P - currently CL&P serves on local public safety committee.
Lead: Public Safety Committee
Priority: High
Status: This project which was identified in the 2008 Plan is an established practice which will be continued.
Potential Funding Sources: General funds
Timeframe: 2014-2019: Bi-monthly meetings

1.2 Continue local tree maintenance work.
Lead: Public Works, Administration
Priority: Medium
Status: This project which was identified in the 2008 Plan is an established practice which will be continued.
Potential Funding Sources: General funds (Note: Additional funding is needed.)
Timeframe: 2014-2019

1.3 Maintain informal agreements with local contractors for emergency debris removal work
Lead: Public Works
Priority: High
Status: This project which was identified in the 2008 Plan is an established practice which will be continued.
Potential Funding Sources: General funds
Timeframe: 2014-2019

Objective 2:
Provide planning and equipment for traffic rerouting.

Strategic Actions:

2.1 Purchase mechanical signs.
Lead: Police, Emergency Management, Administration
Priority: Medium
Status: This project identified in the 2008 Plan was completed prior to the 2014-2019 Plan Update

2.2 Maintain mutual aid agreements with neighboring communities.
Lead: Emergency Management
Priority: Medium
Status: This project which was identified in the 2008 Plan is an established practice which will be continued.
Potential Funding Sources: General funds
Timeframe: 2014-2019

Objective 3:
Minimize risks vulnerable to populations as a result of power failure.

Strategic Actions:
3.1 Maintain special needs population list.
Lead: Social Services
Priority: Medium
Status: This project which was identified in the 2008 Plan is an established practice which will be continued.

Potential Funding Sources: General funds
Timeframe: 2014-2019: annual updates are anticipated.

3.2 Work with convalescent and day care centers to plan for evacuations.
Lead: Emergency Management
Priority: Medium
Status: This project which was identified in the 2008 Plan is an established practice which will be continued.
Potential Funding Sources: General funds
Timeframe: 2014-2019: annual outreach is anticipated.

3.3 Work with CREPC to obtain funding to purchase generators for shelters.
Lead: Emergency Management
Priority: Medium
Status: This project which was identified in the 2008 Plan is an established practice which will be continued.
Potential Funding Sources: General funds
Timeframe: 2014-2019

3.4 Equip a secondary shelter at Tariffville School.
Lead: Emergency Management
Priority: Medium
Status: This project is proposed as a new initiative to be included in the 2014-2019 Plan Update. This project is identified in the Town's Capital Improvements Program. FEMA grant funding was awarded in the fall of 2013.
Potential Funding Sources: General funds and grants
Timeframe: Installation to be completed in 2014

GOAL: REDUCE THE POTENTIAL FOR LOSS OF LIFE AND PROPERTY AS A RESULT OF WIND

Objective 1: Continue to trim/remove hazard trees.
(*Note: This is the same as Objective 1 from Goal 2 above.)*

Strategic Actions:

(The following mitigation measures which were identified in the 2008 Plan are proposed to be continued in the 2014-2019 Plan Update)

1.1 Maintain relationship with CL&P - currently CL&P serves on local public safety committee.
Lead: Public Safety Committee
Priority: High
Status: This project which was identified in the 2008 Plan is an established practice which will be continued.
Potential Funding Sources: General funds
Timeframe: 2014-2019: Bi-monthly meetings

1.2 Continue local tree maintenance work.
Lead: Public Works, Administration
Priority: Medium
Status: This project which was identified in the 2008 Plan is an established practice which will be continued.
Potential Funding Sources: General funds (Note: Additional funding is needed.)
Timeframe: 2014-2019

1.3 Maintain informal agreements with local contractors for emergency debris removal work
Lead: Public Works
Priority: High
Status: This project which was identified in the 2008 Plan is an established practice which will be continued.
Potential Funding Sources: General funds
Timeframe: 2014-2019

Objective 2: Provide planning and equipment for traffic rerouting.
(Note: This is the same as Objective 2 from Goal 2 above.)

Strategic Actions:

2.1 Purchase mechanical signs.
Lead: Police, Emergency Management, Administration
Priority: Medium
Status: This project identified in the 2008 Plan was completed prior to the 2013/14 Update

2.2 Maintain mutual aid agreements with neighboring communities.
Lead: Emergency Management
Priority: Medium
Status: This project which was identified in the 2008 Plan is an established practice which will be continued.
Potential Funding Sources: General funds
Timeframe: 2014-2019

Objective 3:
Coordinate back-up communications.

Strategic Action:
3.1 Continue to implement upgrades to fire, police and town-wide communications systems.
Lead: Emergency Management, Administration
Priority: Medium

Status: This project which was identified in the 2008 Plan is an established practice which will be continued.
Potential Funding Sources: General funds
Timeframe: 2014-2019: Upgrades to be considered annually during the budget process.

THE FOLLOWING ADDITIONAL GOAL, OBJECTIVES AND MITIGATION ACTIONS ARE PROPOSED TO BE INCLUDED IN THE 2014-2019 PLAN UPDATE:

GOAL: IMPROVE ACCESS DURING FLOOD EVENTS

Objective 1:
Raise road elevations to assure access

Strategic Actions:

1.1 Raise Riverside Road near Drake Hill Bridge
Lead: Public Works, Engineering
Priority: High
Potential Funding Sources: Bonding and State Aid
Timeframe: 2016-2018

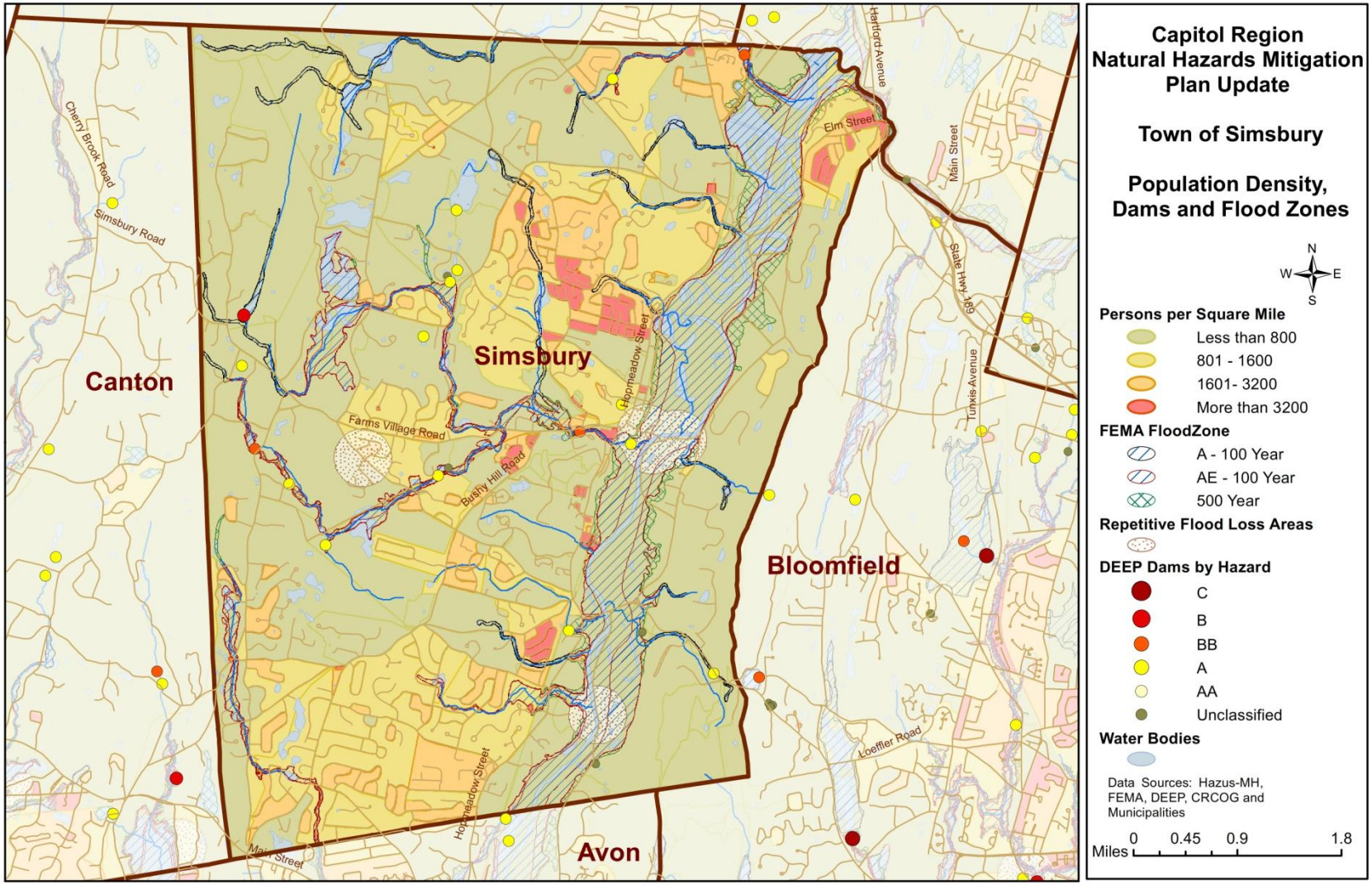
1.2 Raise Route 185 near East Weatogue Street
Lead: Public Works, Engineering
Priority: High
Potential Funding Sources: Bonding and State Aid
Timeframe: 2016-2018

Objective 2:
Co-ordinate efforts with Connecticut DOT

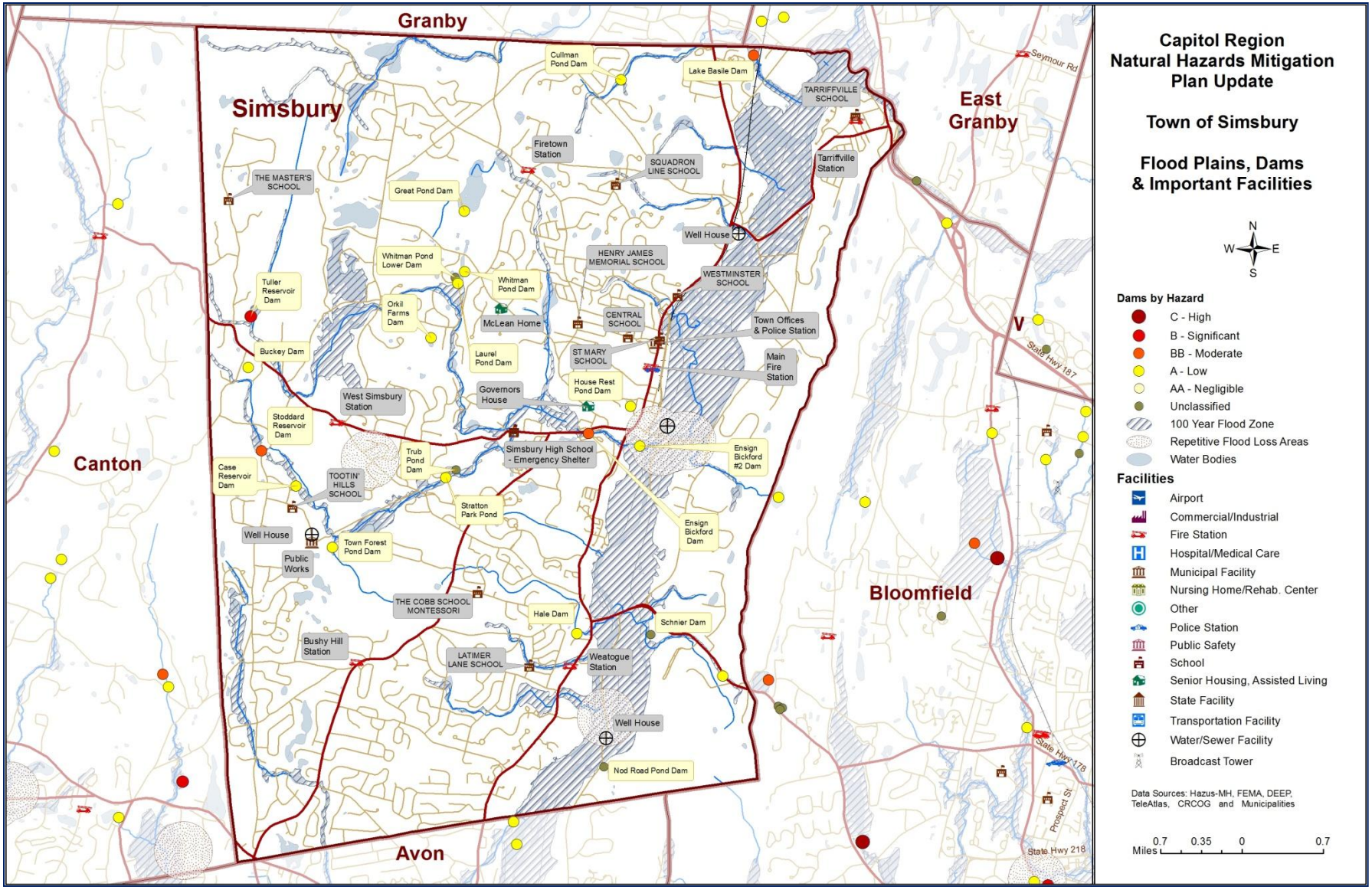
Strategic Actions:

2.1 Coordinate with Connecticut DOT for Route 185 work.
Lead: Public Works, Administration
Priority: High
Potential Funding Sources: General funds
Timeframe: 2015-2018

Map 48: Simsbury Population Density, Dams and Flood Zones



Map 49: Simsbury Flood Plains, Repetitive Loss Areas, Dams and Important Facilities



Somers

The rural town of Somers is located in the northeast corner of the Capitol Region, along the Massachusetts border. The Town has a population of over 11,400, and covers a land area of 28.3 square miles. Elevation ranges from about 250 feet on the western side of town to over 900 feet in the hills on the eastern side. Somers lies in the Scantic River Watershed. Its major watercourses include the Scantic River and Abbey, Gillette, Gulf, Shady, Thrasher, Watchaug and Wrights Brooks, as well as Woods Stream. The main transportation routes through town are north-south state routes 83 and 186, and east-west route 190. Somers hosts the State of Connecticut Osborn and Northern Correctional Facilities. Somers is also home to portions of the Shenipsit State Forest. Principal industries are agriculture and diversified industry.

Challenges

Flooding is a concern for the Town of Somers. The National Flood Insurance Program has paid ten property damage claims in Somers totaling $243,412 to-date. However, there have been no Repetitive Loss Property claims in Somers to-date. No new development or demolition in floodplains has occurred since the 2008 Plan. A particular area of flooding concern is the site of the former Somersville Mill on the Scantic River. On June 1, 2012, the mill burned down and building materials were deposited into the River. The mill site spans the river, is located in the floodplain and restricts flow in the river. The bricks which were deposited in the watercourse as a result of the fire further restrict the Scantic River flow. The mill owner has abandoned the property and the Town is seeking state funding to remove the debris and thus reduce the environmental and flooding hazards here.

A significant flood event could result in much damage. CRCOG used FEMA's Hazus-MH model to analyze the risks that the Town of Somers might face from a major flood. The model estimates that economic losses to the town including residential and commercial damage and business interruptions due to a flood having a 1% chance of occurring any given year (the 100-year flood) would be nearly $13 million. The impacts of such a flood are summarized below:

Estimated Damages from 100-Year Flood	Households Displaced	157
	People Needing Shelter	145
	Buildings at Least Moderately Damaged	10
	Total Estimated Economic Losses	$12,790,000
	Total Residential Building & Content Losses	$4,920,000
	Total Commercial, Industrial & Other Building & Content Losses	$7,770,000
	Total Business Interruption Losses	$120,000

CRCOG also used FEMA's Hazus-MH model to analyze the risks that the Town of Somers might face from a hurricane as powerful as the 1938 hurricane. The model estimates that economic losses to the town including residential and commercial damage and business interruptions due to such a Category 3 hurricane would be over $38 million. The impacts of such a storm are summarized below:

Estimated Damages from a 1938 Strength Hurricane	Households Displaced	0
	People Needing Shelter	0
	Buildings at Least Moderately Damaged	301
	Buildings Completely Damaged	20
	Total Estimated Economic Losses	$38,200,000
	Total Residential Building Losses	$30,160,000
	Total Commercial, Industrial & Other Building & Content Losses	$4,420,000
	Total Business Interruption Losses	$3,630,000
	Total Debris Generated	42,316 tons
	Truckloads (at 25 tons/truck) of building debris	126

According to information from the Connecticut Department of Emergency Management and Homeland Security, the three federally declared natural disasters of 2011 resulted in total expenses to the municipality of over $1.3 million. These expenses include debris and snow removal, emergency protective measures and repairs to damaged infrastructure and buildings but do not include damages experienced by private citizens and businesses.

2011 Disasters Damage Amounts Eligible for 75% Reimbursement Under FEMA Public Assistance Program				
	100% of Amount Eligible for 75% Reimbursement			
Applicant: Town	**DR-1958-CT 2011 Snow**	**DR-4023-CT Irene August 2011**	**DR-4046-CT Severe Weather Oct 2011 Alfred)**	**Total Damages Eligible for Public Assistance Due to 2011 Disasters**
Town of Somers	**$52,949.48**	**$35,555.20**	**$1,218,810.02**	**$1,307,314.70**

Providing back-up power and sufficient sheltering capabilities during prolonged outages is also a concern of the Town. The Town's primary shelter is the High School. To address the need to increase shelter capacity, the Town has discussed providing a secondary shelter/warming center. Such a secondary center would allow classes to resume at the High School while meeting residents' needs at another location. The Senior Center has been considered for this purpose and could also serve as a backup polling place in the event of a power outage.

Goals, Objectives and Strategies

GOAL: REDUCE THE LOSS OF LIFE AND PROPERTY AND ECONOMIC CONSEQUENCES AS A RESULT OF NATURAL DISASTERS

Objective 1:
Reduce the likelihood of flooding.

Strategic Actions:

1.1 Implement the recommendations of the Somers Floodplain Management Study.

Lead: Floodplain Manager, Land Use, Engineering, Public Works, and Administration (Note: due to reorganization, the Land Use Department replaces the Planning Department for the plan update.)

Priority: High (Note: The priority for this mitigation action was Medium in the 2008 Plan, however, the Town has revised the priority to High for the 2014-2019 Plan Update.)

Status: There were several flood studies developed for specific areas of town. In 2013, the Town was awarded a $500,000 STEAP (Small Town Economic Assistance Program) grant to improve culverts on Battle Street and Mountain Road. As an initial project to be funded with this grant, the Town will hire a consultant to prioritize which culverts to improve. ACOE & DEEP permits will also need to be obtained.

Potential Funding Sources: STEAP grants as well as LoCIP, TAR and bond funds as needed to undertake additional culverts.

Timeframe: 2013-2015

1.2 Continue to use the Floodplain Management Studies as a resource in determining the potential impacts of proposed development and town projects to be included in the Capital Improvements Program.

Lead: Floodplain Manager, Engineering, Land Use Department, Planning Commission, Zoning Commission

Priority: Medium

Status: As part of development review process, plans are reviewed for flood impacts and floodplain regulations are enforced. Peak runoff from new development is detained in detention basins per the town's regulations. (There have been few new development proposals and subdivisions proposed in last 5 years, however.) The Town also uses the flood studies to identify projects to be included in the Capital Improvements Program. Also, a recent University of New Hampshire inventory and study of road surface conditions identified a number of road flooding issues. Use of the flood studies in the development review process will continue as a routine effort. Semi-annual reviews of road conditions will be conducted.

Potential Funding Sources: Operating expense budget

Timeframe: 2014-2019

1.3 Work with the DEEP to improve the Camp Road dam.

Lead: Public Works, Administration

Priority: Medium

Status: In the 2008 Plan, this strategic action was identified as, "Work with the YWCA and DEEP to improve the Camp Road dam, regardless of ownership." The Town was awarded a grant in December 2012 to purchase the YWCA property and is currently finalizing the sales contract. Some improvements to the dam were made over the past few years: a clogged structure was removed and overflow pipes were replaced. Additional improvements and permitting are needed at the outlet.

Potential Funding Sources: Operations funding will be used for the additional dam improvements that are needed. Grant funding opportunities will also be reviewed as potential sources of funding.

Timeframe: 2014 to 2015

1.4 Improve drainage system through continued replacement and maintenance of older culverts.

Lead: Public Works, Administration

Priority: Medium

Status: In the 2008 Plan, this strategic action was identified as, "Improve artificial drainage system through continued lining of older culverts to increase flow capacity." Gulf Road and Stafford Road culverts were relined over the past several years.

Potential Funding Sources: Operating budget, grants, CIP, bonding

Timeframe: 2014-2018: specific projects to be identified annually

1.5 Investigate participation in FEMA's Community Rating System program.

Lead: Emergency Management, Land Use Department, Administration
(Note: due to reorganization, the Land Use Department replaces the Planning Department for the plan update.)

Priority: Medium

Status: Deferred until 2014-2015.
The Town plans to work in conjunction with CRCOG to establish the Community Rating System program in Town.

Potential Funding Sources: Operating budget, grants

Timeframe: 2014-2018

<u>Objective 2</u>:
Reduce the likelihood of damage from wind and severe storms.

<u>Strategic Actions</u>:

2.1 Continue preventive tree maintenance.

Lead: Public Works, Tree Warden

Priority: High (Note: The priority for this mitigation action was Medium in the 2008 Plan, however, the Town has revised the priority to High for the 2014-2019 Plan Update.)

Status: The Town maintains an inventory of trees requiring trimming and hires a private contractor to assist with tree trimming on an as needed basis. Over last three years, tree trimming has been done on average of three times per month.

Potential Funding Sources: DPW operating funds

Timeframe: 2014-2019

2.2 Acquire emergency generators at Town Hall and Senior Center to ensure continuity of government and provide additional sheltering capacity.

Lead: Administration, Emergency Management, Public Works

Priority: High

Status: This initiative is a refinement of a strategic action identified in the 2008 Plan to "Increase sheltering capacity and educate residents on emergency sheltering." (See below). To address the need to increase shelter capacity, the Town has discussed providing a secondary shelter/warming center which would allow residents needs to be met at a location other than the high school (which is the Town's primary emergency shelter) as sheltering needs diminish in the days following an event. A secondary facility would allow classes to resume at the high school while meeting residents' needs at another location. The Senior Center has been considered for this purpose and could also serve as a backup polling place in the event of a power outage.

Potential Funding Sources: Grants, operating funds

Timeframe: By 2016.

2.3 Educate residents on having a personal family disaster safety plan and emergency supply kit.

Lead: Emergency Management

Priority: High

Status: This initiative is a revision of a strategic action identified in the 2008 Plan to "Increase sheltering capacity and educate residents on emergency sheltering." (See below). Public outreach is and will be a routine effort.

Potential Funding Sources: Operating funds

Timeframe: 2014-2019

2.4 Encourage new developments housing special needs populations to include generators for sheltering on site.

Lead: Land Use, Building

Priority: Medium

Status: It is recommended this action be continued in the Plan Update. The Town intends to review ordinance proposals to require generators for new such developments.

Potential Funding Sources: Operating funds

Timeframe: 2014-2019: As developments are proposed.
Ordinance: 2014

The following mitigation strategy was included in the 2008 Plan; however, the Town modified this strategy for the 2014-2019 plan update replacing it with 2.2 and 2.3 above.

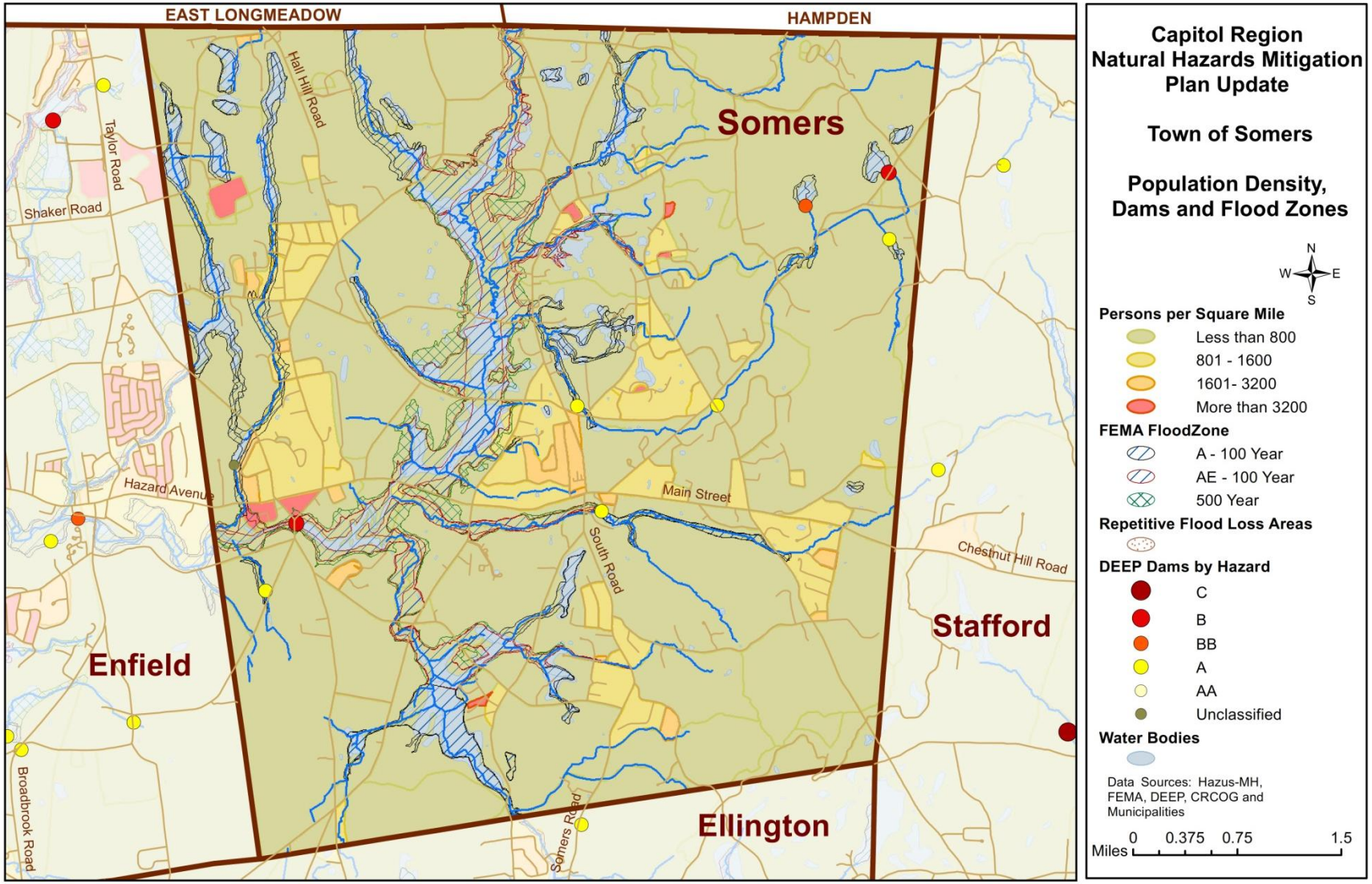
Increase sheltering capacity and educate residents on emergency sheltering.
Lead: Emergency Management and Administration
Priority: Medium
Status: The Town website has been used for educating the public on the availability of emergency shelter services and to advance notifications of impending storms. Press releases to Patch.com and other news outlets are also routinely used to notify about public about shelter facility and services. (Also see strategic action 2.2 above.)

Objective 3:
Reduce the likelihood of damage from forest fires.

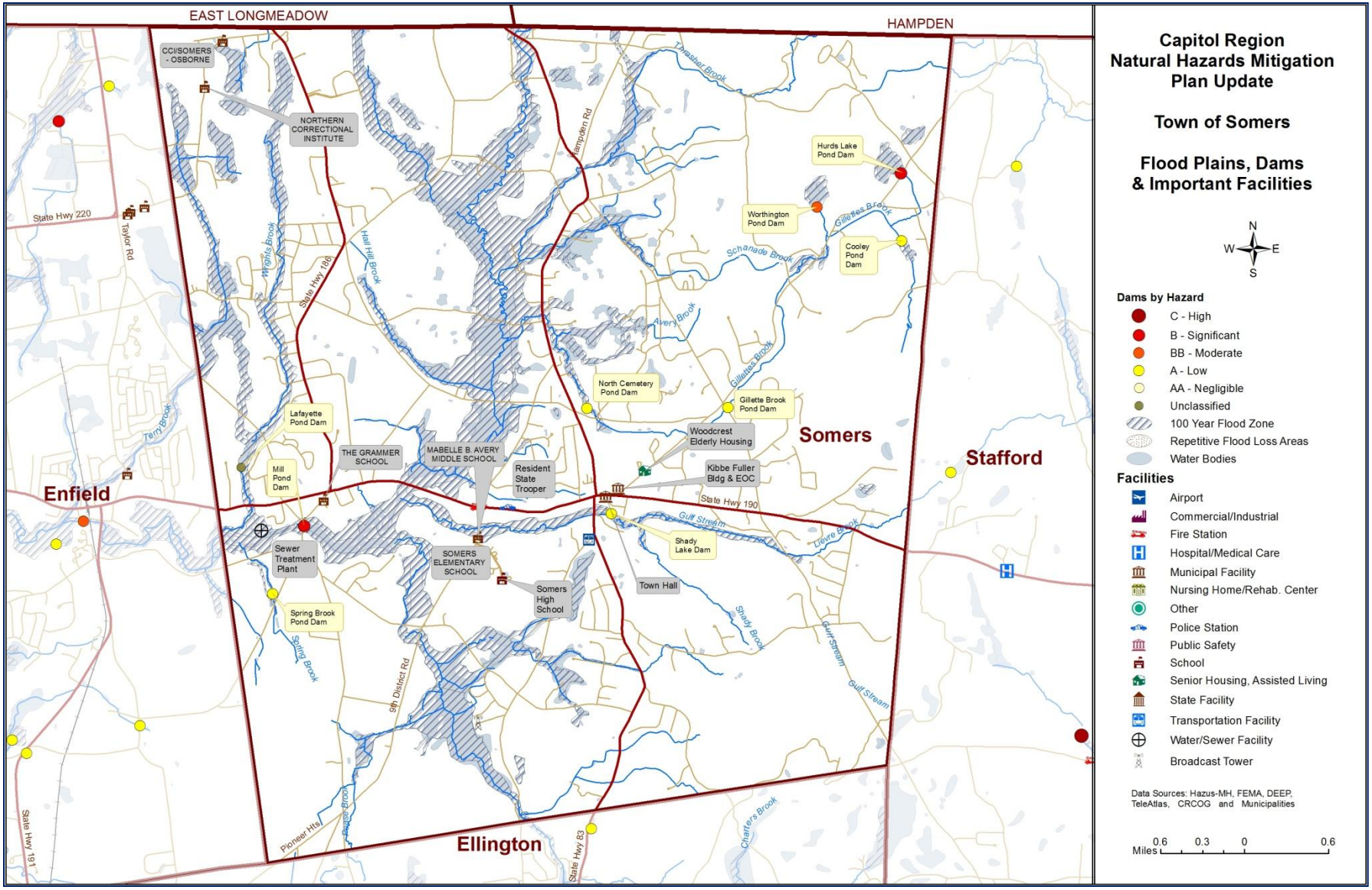
Strategic Actions:

3.1 Continue installation of dry hydrants and cisterns in needed areas of Town.
Lead: Land Use, Fire
Priority: Medium
Status: In the 2008 Plan, this strategic action was identified as, "Implement regulations requiring installation of dry hydrants and cisterns in new developments." The strategic action is restated for the 2014-2019 Plan Update because of the work the Town has accomplished in the past years and to address the fire suppression needs of existing development. In 2007, the Town enacted an ordinance requiring cisterns and dry hydrants for developments not served by public water. Implementation of this requirement will continue on a routine basis as a part of the development review/enforcement process. As developments are reviewed, the ordinance will be enforced. Also, the Fire Department secured grants in 2013 for dry hydrant installation in river at King Road.
Potential Funding Sources: Reviews to be done with current staffing through the Town's operating budget; grants will be sought for additional dry hydrant installations to serve existing developments.
Timeframe: 2014-2019

Map 50: Somers Population Density, Dams and Flood Zones



Map 51: Somers Flood Plains, Repetitive Loss Areas, Dams and Important Facilities



South Windsor

South Windsor is a suburban community northeast of Hartford. It encompasses roughly 28.5 square miles, with a population of about 26,900. The varied topography of South Windsor contributes to three watersheds; primarily to the main stem of the Connecticut River Watershed, but also to the Scantic River in the north and the Hockanum River to the east. The Connecticut River flows along the western boundary. Other major watercourses include the Podunk and Scantic Rivers and Averys, Bancroft, Dry, Newberry and Waples Brooks. Interstate 291 travels through the southwestern corner of South Windsor; other major transportation routes include state routes 5, 30, 74 and 194. Principal industries include commercial and institution food distributors, fuel cell power plants, machine and equipment design and manufacture among others. South Windsor also has significant retail development located in the southeast corner of town, around the Buckland Hills regional mall, and at the Shops at Evergreen Walk.

Challenges

Flooding and severe storms are the primary natural hazards of concern of the Town of Windsor. Flooding has generally localized impacts while severe storms are more likely to have town wide impacts. Severe storms can result in prolonged power outages, disruptions to communications and transportation, and debris management issues.

The Town of South Windsor, through its Flood Plain Regulations (Sec. 5.2 of the Zoning Regulations, revisions adopted in September 2008) mitigates hazards caused by natural processes (floods) by prohibiting the construction of structures designed for human habitation within those zones. The regulations further mitigate hazards by specifying construction standards by which all other structures must comply that take into account flooding effects on structures. Currently, in A or AE zones there are 32 main houses, 17 barns, 5 garages, 3 gazebos, 68 sheds, 11 trailers, a wastewater treatment plant, and 2 pump stations. The National Flood Insurance Program has paid 16 property damage claims in South Windsor totaling $117,095 to-date. South Windsor has had four Repetitive Loss Property claims on one property totaling $42,689 to-date. The town is also aware of two houses on Ferry Lane and two on Main Street that have been damaged more than once by floods; although it does not appear these structures are insured under the National Flood Insurance Program. Since 2008, there has been no construction or demolition in the floodplains.

A significant flood event could result in much damage in flood prone areas of the town. CRCOG used FEMA's Hazus-MH model to analyze the risks that the community might face from flooding. The model estimates that economic losses to the town including residential and commercial damage and business interruptions due to a flood having a 1% chance of occurring any given year (the 100-year flood) would be over $33 million. The impacts of such a flood are summarized below:

Estimated Damages from 100-Year Flood	Households Displaced	289
	People Needing Shelter	542
	Buildings at Least Moderately Damaged	48
	Total Estimated Economic Losses	$33,240,000
	Total Residential Building & Content Losses	$16,370.000
	Total Commercial, Industrial & Other Building & Content Losses	$16,800,000
	Total Business Interruption Losses	$80,000

CRCOG also used FEMA's Hazus-MH model to analyze the risks that the Town of South Windsor might face from a hurricane as powerful as the 1938 hurricane. The model estimates that economic losses to the town including residential and commercial damage and business interruptions due to such a Category 3 hurricane would be over $131 million. The impacts of such a storm are summarized below:

Estimated Damages from a 1938 Strength Hurricane	Households Displaced	28
	People Needing Shelter	2
	Buildings at Least Moderately Damaged	1009
	Buildings Completely Damaged	71
	Total Estimated Economic Losses	$131,400,000
	Total Residential Building Losses	$90,700,000
	Total Commercial, Industrial & Other Building Losses	$26,600,000
	Total Business Interruption Losses	$14,100,000
	Total Debris Generated	45,147 tons
	Truckloads (at 25 tons/truck) of building debris	455

According to information from the Connecticut Department of Emergency Management and Homeland Security, the three federally declared natural disasters of 2011 resulted in total expenses to the municipality and other local agencies of over $7.1 million. These expenses include debris and snow removal, emergency protective measures and repairs to damaged infrastructure and buildings but do not include damages experienced by private citizens and businesses. There were two commercial building roofs damaged during Storm Alfred in October 2011.

2011 Disasters Damage Amounts Eligible for 75% Reimbursement Under FEMA Public Assistance Program				
Applicant: Municipality & Other Agencies (i.e., Fire Districts, Schools, and Private Non-Profit Agencies)	**100% of Amount Eligible for 75% Reimbursement**			**Total Damages Eligible for Public Assistance Due to 2011 Disasters**
	DR-1958-CT 2011 Snow	**DR-4023-CT Irene August 2011**	**DR-4046-CT Severe Weather Oct 2011 (Alfred)**	
Town of South Windsor	$99,058.79	$153,119.56	$6,860,182.25	$7,112,360.60
South Windsor Other			$1,604.08	$1,604.08
South Windsor Total	**$99,058.79**	**$153,119.56**	**$6,861,786.33**	**$7,113,964.68**

Goals, Objectives and Strategies

The Town reassessed and evaluated the goals, objectives and mitigation actions identified in the 2008 Plan. Some mitigation actions were restated and for some, lead agencies or priorities were revised. The Town also identified a number of new mitigation actions to initiate over the next five years.

GOAL: MINIMIZE LOSS OF LIFE AND PROPERTY AND ECONOMIC DISRUPTION RESULTING FROM NATURAL DISASTERS

Objective 1:
Ensure dams and detention basins are in good repair.

Strategic Actions:

1.1 Assess and make recommendations on public and private structures including, but not limited to, Avery Heights dam, dam at Lake St., dam at Veteran's Park off Parkview Dr., and Dzen's dam.
Lead: Parks and Grounds, Administration
Priority: Medium
Status: Will be assessed on a case by case basis for private structures and public structures will be inspected annually.
Potential Funding Source: General funds, grants and loans
Timeframe: Annual inspections throughout 2014-2019

1.2 Prioritize recommended measures and work with property owners to implement.
Lead: Parks and Grounds, Administration
Priority: Medium
Status: Will be assessed on a case by case basis
Potential Funding Source: General funds, grants/loans where appropriate
Timeframe: 2014-2019

Objective 2:
Improve communication capabilities to inform resident population.

Strategic Actions:

2.1 Continue effort to require new employees to sign on to Everbridge System.
Lead: Emergency Management, Administration
Priority: Medium
Status: In the 2008 Plan, the Town proposed to purchase a call-back communication system. The Everbridge System was purchased and the Town is now proposing to ensure that staff is trained to fully utilize this communications system. New staff will be trained when hired.
Potential Funding Source: General Fund
Timeframe: 2014-2019

2.2 Harden equipment for potential solar activity
Lead: IT, Public Works, Administration
Priority: Medium
Status: This is a new initiative.
Potential Funding Source: General Fund
Timeframe: 2014-2019

Objective 3:
Ensure the protection of private properties at greatest risk.

Strategic Action:

3.1 Investigate participating in FEMA's Community Rating System.
Lead: Planning, Administration
Priority: Medium
Status: Deferred; however, the Town will continue to consider participation in CRS.
Potential Funding Source: General Fund
Timeframe: 2014-2019

GOAL: REDUCE TIME REQUIRED TO RESTORE COMMERCIAL POWER

Objective 1:
Improve tree limb maintenance to reduce number/area of power outages.

Strategic Actions:

1.1 Continue to contract out tree maintenance work, and to work with CL&P to maintain right-of-ways.
Lead: Public Works, Administration
Priority: Medium
Status: In 2008, the Town proposed to inventory trees in the right-of-way, develop a maintenance plan and contract out tree maintenance work. Due to the cleanup of the large number of downed trees and limbs following Storms Irene and Alfred, much work was done to reduce future risks of power outages due to fallen trees and limbs. For the Plan Update, the Town has restated the manner in which it will address tree maintenance but will continue efforts to reduce potential for power outages due to fallen trees and limbs.
Potential Funding Source: General funds, Utility
Timeframe: 2014-2019

1.2 Improve coordination with State DOT for emergency staging and management for debris, snow, and all other emergencies.
Lead: Public Works, Administration
Priority: High
Status: This is a new initiative.
Potential Funding Source: General Fund
Timeframe: 2014-2019

1.3 Work with CRCOG and State DEEP to establish a regional debris management site.
Lead: Public Works, Administration
Priority: High

Status: This is a new initiative.
Potential Funding Source: General Fund, grants
Timeframe: 2014-2019

1.4 Establish a local debris processing site at Barton Property
Lead: Public Works, Administration
Priority: High
Status: This is a new initiative.
Potential Funding Source: General Fund
Timeframe: 2013-2015

Objective 2:
Improve communication and coordination with electric utility.

Strategic Actions:
2.1 Continue to meet with CL&P representatives to address problems including the implementation of a lock out/tag out system.
Lead: Public Works, Administration, Emergency Management
Priority: High
Status: This effort, identified in the 2008 Plan, is an established practice of the Town and was not included in the Plan Update because it is felt it is a routine effort and is also accomplished through the regional communications effort listed below. CL&P has assigned local liaisons to work directly with the Town.

2.1 Continue regional efforts to improve communications with CL&P and to address problems including implementation of a lockout/tag out system.
Lead: Public Works, Administration, Emergency Management
Priority: High
Status: The town has and will continue to support the region's efforts to improve communications with CL&P particularly through participation in CREPC.
Potential Funding Source: General Fund
Timeframe: 2014-2019

GOAL: MINIMIZE LOSSES TO EXISTING AND FUTURE STRUCTURES FROM SEVERE WEATHER

Objective 1:
Use land use regulations to reduce risk.

Strategic Actions:

1.1 Continue to enforce regulations requiring the dedication of open space in new developments.
Lead: Planning

Priority: Medium
Status: As new developments are proposed and reviewed, Town staff ensures that existing regulations are followed. Because this is an established practice, the Town reassessed the priority assigned to this initiative, changing it from High to Medium.
Potential Funding Source: General Fund
Timeframe: 2014-2019

1.2 Continue to enforce wetlands regulations.
Lead: Inland Wetlands Commission, Wetlands Agent
Priority: Medium
Status: As new developments are proposed and reviewed, Town staff ensures that existing regulations are followed. Because this is an established practice, the Town reassessed the priority assigned to this initiative, changing it from High to Medium.
Potential Funding Source: General Fund
Timeframe: 2014-2019

Objective 2:
Review and improve enforcement of building codes.

Strategic Actions:

2.1 Ensure that privately owned and installed generators are installed correctly.
Lead: Building
Priority: Medium
Status: This is an established practice and will be handled on a case by case basis.
Potential Funding Source: General Fund
Timeframe: 2014-2019

2.2 Will consider whether in the future there is a need to adopt a regulation that requires senior housing developments to install some kind of generator to power at least a communal space.
Lead: Planning, Building
Priority: Medium
Status: Deferred: Reevaluation of the need for this regulation will be undertaken during 2014-2019
Potential Funding Source: General Fund
Timeframe: 2014-2019

Objective 3:
Improve communication with property owners on measures they can take to reduce their losses from severe weather.

Strategic Actions:

3.1 Use municipal website, Facebook, Twitter, Everbridge, You-Tube, and all other available means of social media to educate residents on emergency preparedness.
Lead: Emergency Management, Administration
Priority: Medium
Status: The Town routinely makes updates to emergency preparedness materials posted on its website and proposes to expand this outreach to other forms of social media. Periodic updates and outreach will be conducted throughout the plan period (2014-2019) and particularly in advance of anticipated major events.
Potential Funding Source: General Fund
Timeframe: 2014-2019: periodically and in advance of major events.

3.2 Continue to maintain special needs population list.
Lead: Emergency Management, Health Department
Priority: Medium
Status: The Health Department updated its emergency outreach contact information in FY 2013. This effort will continue and periodic updates will be made throughout the plan period.
Potential Funding Source: General Fund
Timeframe: 2014-2019

3.3 Support replacement of equipment
Lead: Administration, Town Council
Priority: High
Status: This is a new initiative.
Potential Funding Source: General Fund
Timeframe: 2014-2019 – during annual budget process

3.4 Provide generators for Town shelters, Town Garage, Town Hall, and Police Department
Lead: Administration, Town Council
Priority: High
Status: This is a new initiative.
Potential Funding Source: General Fund, grants
Timeframe: 2014-2019– during annual budget and grant application processes

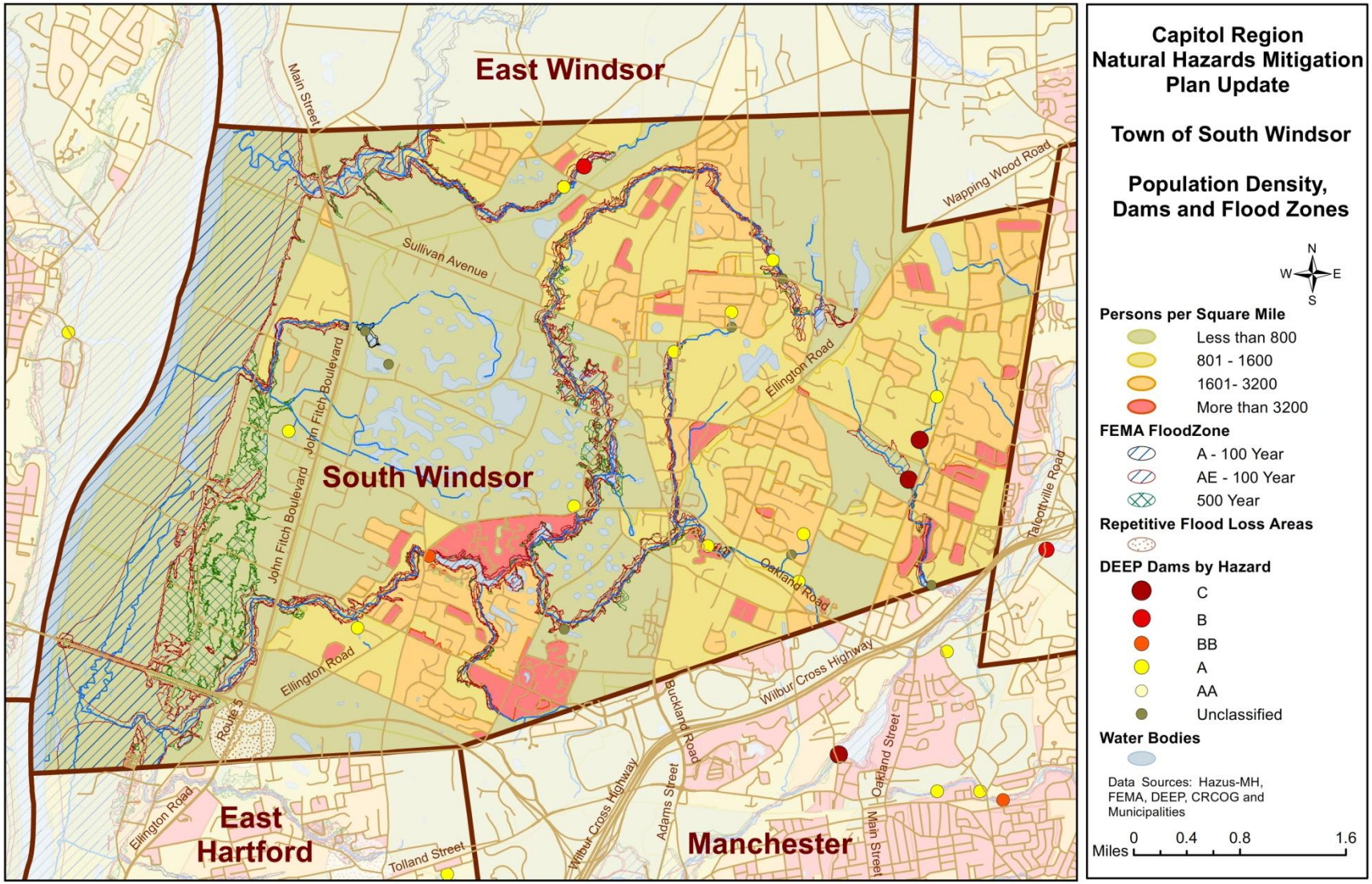
3.5 Purchase cots, food supplies, and other equipment for emergency operations.
Lead: Administration, Town Council
Priority: High
Status: This is a new initiative.
Potential Funding Source: General Fund, grants
Timeframe: 2014-2019– during annual budget and grant application processes

3.6 Produce GIS mapping of critical town facilities.
Lead: IT, Emergency Management
Priority: High
Status: This is a new initiative.
Potential Funding Source: General Fund
Timeframe: 2014-2019

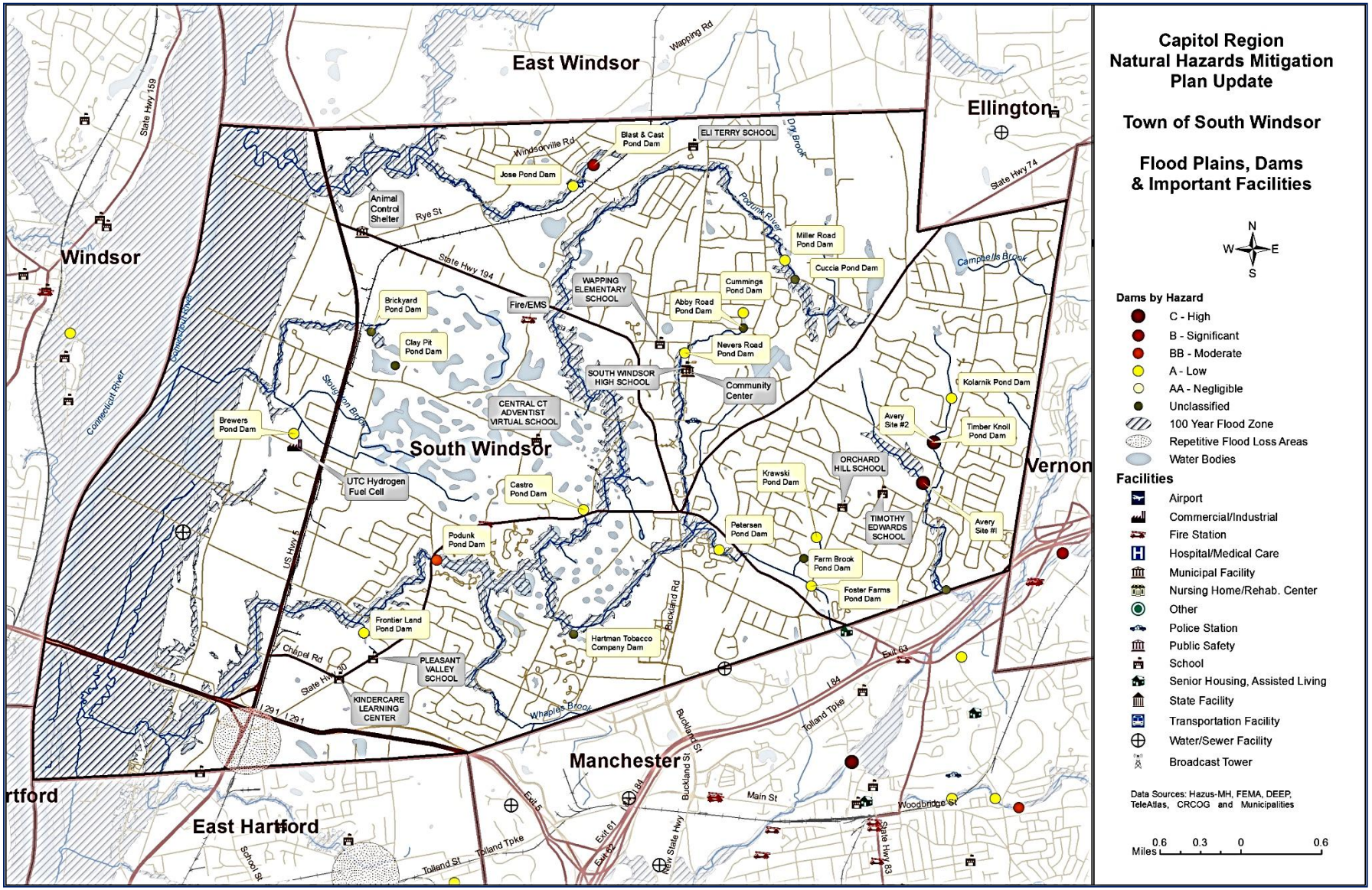
3.7 Establish MOU with local food distributors and special emergency response equipment suppliers for emergency services.
Lead: Emergency Management, administration
Priority: High
Status: This is a new initiative.
Potential Funding Source: General Fund
Timeframe: 2014-2019

3.8 Schedule quarterly reviews of GIS layers (data sets) and Town Emergency Operations Plan.
Lead: Emergency Management, Administration
Priority: High
Status: This is a new initiative.
Potential Funding Source: General Fund
Timeframe: Quarterly reviews to be conducted throughout 2014-2019

Map 52: South Windsor Population Density, Dams and Flood Zones



Map 53: South Windsor Flood Plains, Repetitive Loss Areas, Dams and Important Facilities



Stafford

Stafford is a rural community of approximately 12,000 residents. Situated in the Willimantic River Valley between almost parallel ranges of hills, Stafford is located in the northern portion of Tolland County approximately 20 miles from the City of Hartford. Located on the state line, Stafford is bordered by the Towns of Monson, Hampden, and Wales, Massachusetts to the north and the Town of Union, Connecticut to the east, the Towns of Willington and Ellington to south and the Town of Somers to the west. Stafford covers approximately 58 square miles, making it the third largest town (land area) in Connecticut. Throughout the town, there are numerous lakes, ponds, streams, forests and farmlands.

Stafford has a rich historical heritage. Long before its incorporation as a town in 1719, the famous mineral springs drew Indians and settlers to the Stafford area for the curative properties of the water. In addition to its reputation as a resort area, Stafford became known for its textile mills in the later 1800's. Some of the world's most famous cloth was (and still is) woven in this town. Today, Stafford displays a rich tapestry of quaint mills, Victorian houses, and rolling country from agrarian roots to its industrial foundations. There is a developed downtown business section bordered by several parks.

Town of Stafford is comprised of villages, hamlets and a borough all under one town government. They are the borough of Stafford Springs, the village of Staffordville, the hamlet of Orcuttville, the village and historic district of Stafford Hollow, the village of Hydeville and West Stafford. All of these communities are located on tributaries of the Willimantic River.

Stafford's main industry is manufacturing and local companies produce woolen products, printed circuits, filters, metal bushings and bearings, precision medical devices, fly rod components, and nameplates and labels. Other important industries are nursery and horticultural products, health care services, seasonal camping, motor sports, and recreation. TTM Industries' three locations (Industrial Park Road, Upper Road, and Old Monson Road), 3M Inc. (located on River Road) and Willington Name Plate (located on Middle River Drive) all utilize various hazardous materials which are reported to the Local Emergency Planning Committee (LEPC). TTM's facility on Upper Road is located within 500 yards of the Staffordville School and plans exist to address this specific hazard both at the facility, the school, and the Staffordville Fire Department.

There are approximately 5,000 housing units in Stafford. Most are single family homes and typically of wood frame construction. There are also three campgrounds that attract a seasonal population of approximately 2,000. Sun Valley on Old Springfield Road has a seasonal population of approximately 900; Mineral Springs on Leonard Road houses approximately 100 and Roaring Brook on South Road serves approximately 1000.

Johnson Memorial Hospital, located on Route 190 in Stafford, is a modern hospital built in 1975 and services the medical needs of populations in northern Hartford, Tolland and Windham counties. Adjoining the hospital is a professional building which houses the practices of area doctors. Evergreen Health Care Center is a long-term care facility that is also located at this site. Evergreen and JMH serve several area towns. Both the long-term care facility and the hospital have disaster plans in place that have been shared with the local Emergency Management Director and the Fire Department.

Challenges

The primary natural hazard for Stafford is flooding that might be caused by overflow from the numerous rivers and streams that flow through the town or from possible failure of one or more of the fifty-seven (57) dams located within the town boundaries or from those located in upstream communities. Historically most of flood damage in Stafford has been caused by the Middle River, Furnace Brook and their tributaries. Industrial and textile plants, stores, public buildings, businesses and private property located in the flood plains had been flooded 18 times between 1900 and 1980. Six of the floods caused damage of more than half a million dollars each. The most severe of the floods occurred in 1936, 1938, and 1955. The 1955 flood resulting from 12 inches of rainfall deposited by Hurricane Diane into the watershed caused an estimated 1.3 million dollars in damage. This was the last major flooding event to occur in Stafford. Heavy rainfall in October of 2005 caused numerous localized flooding of small streams and rivers and washed away several roads causing moderate to severe damage. In addition, severe damage occurred at the Stafford Water Pollution Control Facility due to flooding of the Willimantic River.

The most severe historical damage cause by dam failure occurred in the spring of 1877 when a dam that had been constructed the previous fall and winter on the Stafford Reservoir gave way. The torrent of water washed down the beds of Furnace Brook obliterating nine other dams on its five mile trip to Stafford Springs. This dam break cost the community approximately $400,000 in damage, the loss of two lives and long term economic hardship for businesses in its path. Today there are fifty-seven (57) dams in the Town of Stafford. The Connecticut Department of Energy and Environmental Protection (DEEP) has classified eight of these as High Hazard (category C). Five of the High Hazard dams are owned and maintained by the State of Connecticut. The remaining three: the Staffordville Reservoir Dam, the Warren Pond Dam and the Riverside Pond Dam, are privately owned. There are six dams designated as having a Significant Hazard risk (category B). Of these six, the State of Connecticut owns and maintains the Bradway Reservoir Dam #4. All other category B dams are privately owned. There are eleven privately owned and one municipally owned category BB (Moderate Hazard) dams. All seventeen (17) category A and AA dams are privately owned and fourteen (14) dams have no hazard or owner designation.

A FEMA Flood Insurance Study was conducted in 1981 for the Town of Stafford and the town has incorporated Floodplain Regulations into its Zoning Regulations. Past encroachment within the floodway and/or the floodway fringe has occurred in the following areas: Rt. 32 south of the town as well as numerous smaller town roads. These encroachments reduce the flood-carrying capacity of waterways, increase the flood height of streams, and increases flood hazards in areas beyond the encroachment itself. The National Flood Insurance Program has paid four property damage claims in Stafford Springs totaling $22,257.15 and 28 claims in Stafford totaling $381,154.22 to-date. However, there have been no Repetitive Loss Property claims in Stafford or Stafford Springs to-date. Since the adoption of the 2008 Plan, Stafford has not permitted any new construction in the 100 Year flood plain. In 2010, the Town revised its Inland Wetlands and Watercourses Regulations to be in accordance with the State model regulations.

A significant flood event could result in much damage. CRCOG used FEMA's Hazus-MH model to analyze the risks that the Town of Stafford might face from a major flood. The model estimates that economic losses to the town including residential and commercial damage and business interruptions due to a flood having a 1% chance of occurring any given year (the 100-year flood) would be over $50 million. The impacts of such a flood are summarized below:

Estimated Damages from 100-Year Flood	Households Displaced	240
	People Needing Shelter	298
	Buildings at Least Moderately Damaged	27
	Expected Damage to Essential Facilities	Police station will sustain loss of use
	Total Estimated Economic Losses	$50,620,000
	Total Residential Building & Content Losses	$16,320,000
	Total Commercial, Industrial & Other Building & Content Losses	$34,100,000
	Total Business Interruption Losses	$200,000

CRCOG also used FEMA's Hazus-MH model to analyze the risks that the Town of Stafford might face from a hurricane as powerful as the 1938 hurricane. The model estimates that economic losses to the town including residential and commercial damage and business interruptions due to such a Category 3 hurricane would be over $55 million. The impacts of such a storm are summarized below:

Estimated Damages from a 1938 Strength Hurricane	Households Displaced	19
	People Needing Shelter	3
	Buildings at Least Moderately Damaged	419
	Buildings Completely Damaged	17
	Total Estimated Economic Losses	$55,122,000
	Expected Damage to Essential Facilities	Hospital has probability of greater than 50% of sustaining at least moderate damage
	Total Residential Building Losses	$42,118,000
	Total Commercial, Industrial & Other Building Losses	$8,101,000
	Total Business Interruption Losses	$4,903,000
	Total Debris Generated	153,186 tons
	Truckloads (at 25 tons/truck) of building debris	190

According to information from the Connecticut Department of Emergency Management and Homeland Security, the three federally declared natural disasters of 2011 resulted in total expenses to the municipality of over $1.3 million. These expenses include debris and snow removal, emergency protective measures and repairs to damaged infrastructure and buildings but do not include damages experienced by private citizens and businesses.

2011 Disasters Damage Amounts Eligible for 75% Reimbursement Under FEMA Public Assistance Program				
Applicant: Town & Others (i.e., Fire Districts, Schools, and Private Non-Profit Agencies)	**100% of Amount Eligible for 75% Reimbursement**			**Total Damages Eligible for Public Assistance Due to 2011 Disasters**
	DR-1958-CT 2011 now	**DR-4023-CT Irene August 2011**	**DR-4046-CT Oct 2011 Alfred)**	
Town of Stafford	$58,390.40	$24,715.39	$115,652.35	$198,758.14
Stafford Other	$18,923.27	$4,713.82		$23,637.09
Stafford Total	**$77,313.67**	**$29,429.21**	**$115,652.35**	**$222,395.23**

Stafford is heavily wooded. Power outages and road blockages following storms are a concern as are blockages along fire roads which could hamper wildfire fighting efforts.

Goals, Objectives and Strategies

Because this plan is Stafford's first Natural Hazard Mitigation Plan, all mitigation actions are considered new initiatives although some may be current practices.

GOAL: REDUCE PROPERTY DAMAGE DUE TO UNSAFE CONDITIONS RESULTING FROM WINTER STORMS

Objective 1:
Improve snow removal equipment and techniques.

Strategic Actions:

1.4 Pursue increased funding for equipment and labor.
Lead: Public Works, Administration
Priority: Medium
Status: This is a current practice, but a new initiative for this plan.
Potential Funding Sources: Town General fund
Timeframe: Spring/Summer 2014

1.5 Continue to pursue opportunities for service and equipment sharing with neighboring communities through CRCOG's service sharing initiative and otherwise.
Lead: Public Works, Administration
Priority: Low
Status: This is a current practice, but a new initiative for this plan.
Potential Funding Sources: Town General fund
Timeframe: 2014- 2019

1.6 Improve Public Works personnel contracts to ensure adequate staffing for storm situations.
Lead: Administration
Priority: Low
Status: This is a current practice, but a new initiative for this plan.
Potential Funding Sources: Town General fund
Timeframe: Summer 2015

Objective 2:
Remove and prevent impediments to snow removal operations.

Strategic Actions:

2.1 Educate private snow-removal contractors and residents on not obstructing roads and the right-of-way.
Lead: Police and Fire
Priority: Medium
Status: This is a current practice, but a new initiative for this plan.
Potential Funding Sources: Town General fund
Timeframe: 2014-2019: Annual outreach is anticipated.

2.2 Enforce existing ordinance prohibiting roadway obstructions.

Lead: Police
Priority: Medium
Status: This is a current practice, but a new initiative for this plan. Efforts are undertaken on an as needed basis in response to storm events.
Potential Funding Sources: Town General fund
Timeframe: 2014 – 2019

Objective 3:
Educate public on hazardous conditions during storm events - promote safe driving techniques.

Strategic Action:
3.1 Continue to issue press releases and advisories.

Lead: Emergency Management, Police
Priority: High
Status: This is a current practice, but a new initiative for this plan. Efforts are undertaken on an as needed basis anticipation of storm events
Potential Funding Sources: Town General fund
Timeframe: 2014 – 2019.

GOAL: IMPLEMENT GUIDELINES AND REGULATIONS TO REDUCE EXPOSURE TO PROPERTY DAMAGE AND LOSS OF LIFE AS A RESULT OF FLOODING

Objective 1:
Restrict development of buffer areas in flood prone zones and promote best development practices for minimizing environmental impacts.

Strategic Actions:

1.1 Continue to work to maintain zoning, subdivision and wetlands regulations current with best practices.

Lead: Building/Zoning/Land Use
Priority: High
Status: This is a current practice, but a new initiative for this plan. Efforts are undertaken as development proposals are reviewed and inspections are conducted.
Potential Funding Sources: Town General fund
Timeframe: 2014-2019

1.3 Complete and implement stormwater management plan.

Lead: Engineering, Building/Zoning/Land Use
Priority: Medium
Status: New Initiative
Potential Funding Sources: Town General fund, State grants
Timeframe: Expected completion date-Spring/Summer2014

Objective 2:
Maintain waterways, drainage and other structures in critical flood areas.

Strategic Actions:

2.1 Address priority bridge, culvert and other drainage projects identified in Capital Improvement Plan.
Lead: Public Works, Engineering, Administration
Priority: High
Status: New Initiative. To be initiated in the fall of 2013 and undertaken in 2014-2019
Potential Funding Sources: Town General fund, bonding, State and FEMA grants
Timeframe: 2014-2019

2.2 Work with DEEP to continue to monitor critical dams.
Lead: Engineering, Emergency Management
Priority: Medium
Status: New Initiative. To be initiated in the fall of 2013 and undertaken in 2014- 2019
Potential Funding Sources: Town General fund
Timeframe: 2014-2019

2.3 Develop action plan, time table and budget to repair dams
Lead: Engineering, Emergency Management
Priority: High
Status: New Initiative. To be initiated in the fall of 2013 and undertaken in 2014-2019
Potential Funding Sources: Town General fund, bonding, DEEP
Timeframe: 2014-2019

Objective 3:
Ensure traffic safety during flood events.

Strategic Action:
3.1 Improve communications with neighboring communities on road closures and detour routing.
Lead: Police, Fire
Priority: High
Status: New Initiative. To be initiated in the fall of 2013 and undertaken in 2014-2019
Potential Funding Sources: Town General fund
Timeframe: 2014-2019

3.2 Educate police personnel on detour routing protocols to ensure alternative routes can accommodate trucks.
Lead: Police
Priority: Medium
Status: New Initiative. To be initiated in the fall of 2013 and undertaken in 2014-2019
Potential Funding Sources: Town General fund
Timeframe: 2014-2019

GOAL: REDUCE PERSONAL PROPERTY DAMAGE AND POWER FAILURES CAUSED BY HIGH WINDS

Objective 1:
Aggressively work with utility companies to identify high risk areas and promote tree trimming.

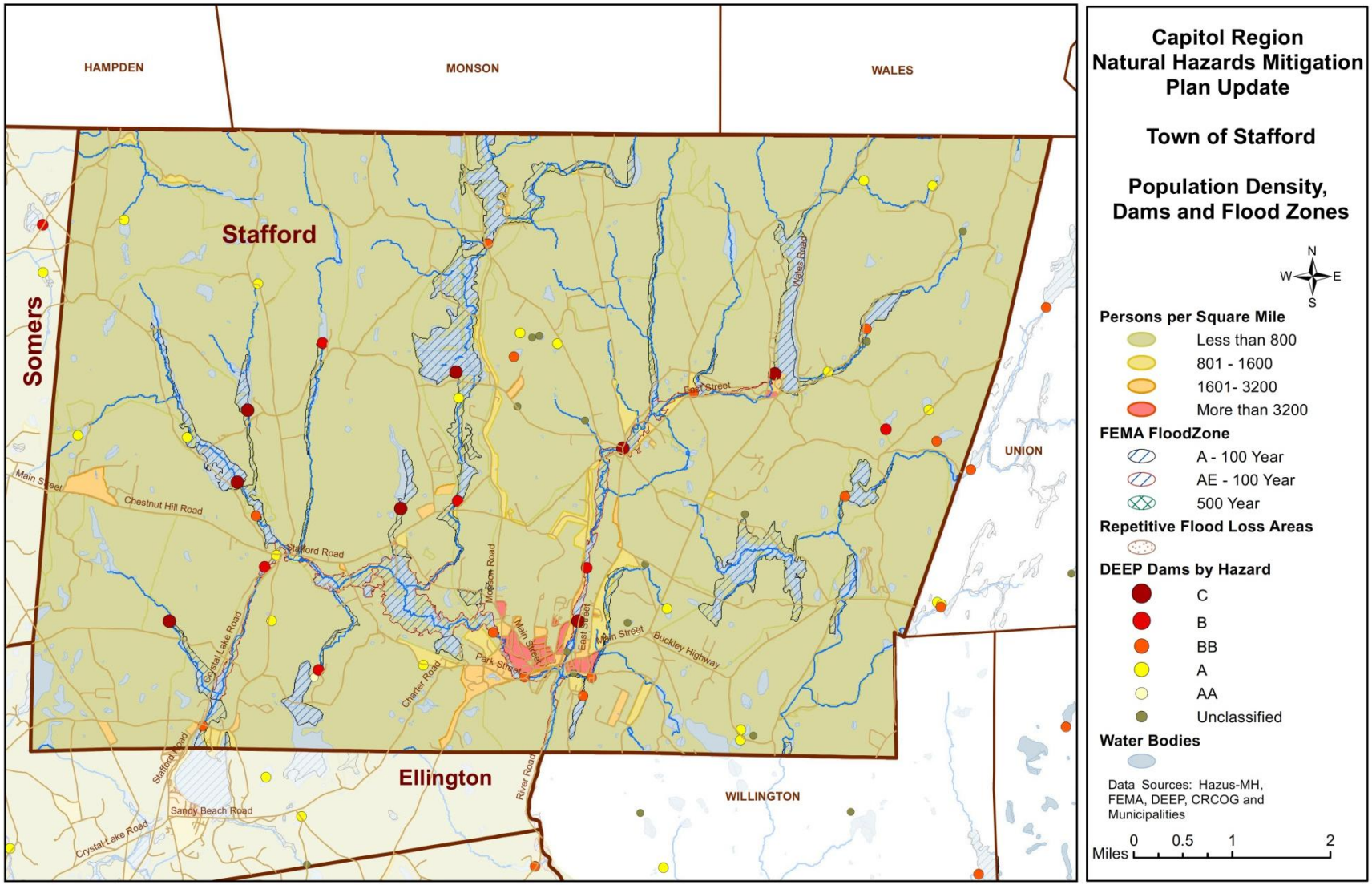
Objective 2:
Relocate high density utility facilities underground.

Strategic Action:

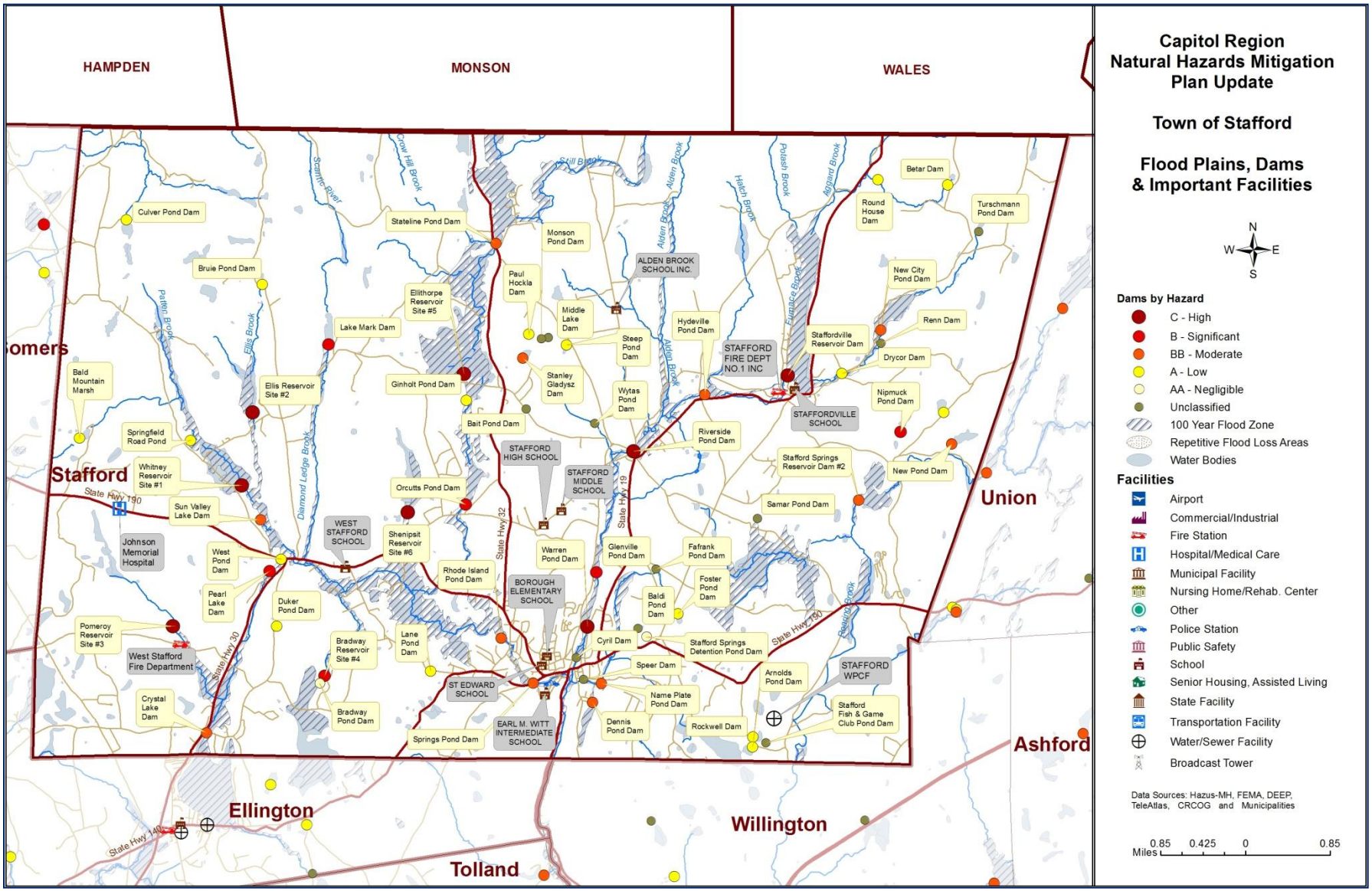
2.1 Create a long range plan for undergrounding existing facilities.
Lead: Building/Zoning/Land Use, Emergency Management
Priority: Low
Status: New Initiative
Potential Funding Sources: Federal, state, local, bonding, and private sources (utilities, developers, property owners).
Timeframe: 2014-2019

2.2 Pursue opportunities to relocate wires where they are vulnerable: areas of repetitive power failure.
Lead: Emergency Management, Building/Zoning/Land Use
Priority: Medium
Status: This is a current practice, but a new initiative for this plan.
Potential Funding Sources: Federal, state, local, bonding, and private sources (utilities, developers, property owners).
Timeframe: 2014 – 2019

Map 54: Stafford Population Density, Dams and Flood Zones



Map 55: Stafford Flood Plains, Repetitive Loss Areas, Dams and Important Facilities



Suffield

Suffield is a rural community located along the Massachusetts border. It encompasses about 42.2 square miles and has a population of about 15,735. Suffield's terrain rises from an elevation of 22 feet above sea level at the Connecticut River to its highest point of 691 feet above sea level on West Suffield Mountain. Suffield's land area contributes to three watersheds: the Farmington River Watershed to the west, the Stony Brook Watershed centrally and the main stem of the Connecticut River Watershed to the east. The Connecticut River runs the length of the eastern boundary of Town. Other major watercourses include Clay, Deep, Fourmile, Mountain Brook, Muddy, Philo, Rawlins and Stony Brooks. State routes 75, 168, 187 and 190 provide major transportation routes through town. Agriculture, manufacture of ice cream, industrial gases, small tools, and warehousing are the principal industries. Part of Bradley International Airport and the North Central Connecticut Correctional facility are also located in Suffield.

Challenges

Suffield has approximately 5,469 housing units of which 27 units are located in flood hazard zones. There are also another 31 structures located in flood hazard zones. There are a few areas throughout the town prone to street flooding during heavy storm events. Ensuring proper maintenance of drainage structures is a challenge due to decreased staffing and budget levels. Maintaining accessibility throughout Town during storms can be a challenge given the streams, steep slopes, and narrow roads in some areas. Also, certain areas in the more rural West Suffield are more vulnerable to power outages because of the large number of trees near the roads. Suffield has worked to reduce its vulnerability to natural hazards. There has not been any construction or demolition since 2008 in floodplain or other vulnerable areas of Suffield. In 2008, the Town added Section V.K. Flood Damage Prevention to the Zoning Regulations.

The National Flood Insurance Program has paid five property damage claims in Suffield totaling $5,733 to-date. Suffield has no Repetitive Loss Property claims to-date. Although flooding is not as large a concern in Suffield as in some other communities, a significant flood event could result in much damage. CRCOG used FEMA's Hazus-MH model to analyze the risks that the Town of Suffield might face from a major flood. The model estimates that economic losses to the town including residential and commercial damage and business interruptions due to a flood having a 1% chance of occurring any given year (the 100-year flood) would be over $24 million. The impacts of such a flood are summarized below:

Estimated Damages from 100-Year Flood	Households Displaced	258
	People Needing Shelter	291
	Buildings at Least Moderately Damaged	12
	Total Estimated Economic Losses	$24,030,000
	Total Residential Building & Content Losses	$14,600,000
	Total Commercial, Industrial & Other Building & Content Losses	$9,400,000
	Total Business Interruption Losses	$40,000

CRCOG also used FEMA's Hazus-MH model to analyze the risks that the Town of Suffield might face from a hurricane as powerful as the 1938 hurricane. The model estimates that economic losses to the

town including residential and commercial damage and business interruptions due to such a Category 3 hurricane would be nearly $56 million. The impacts of such a storm are summarized below:

Estimated Damages from a 1938 Strength Hurricane	Households Displaced	6
	People Needing Shelter	0
	Buildings at Least Moderately Damaged	465
	Buildings Completely Damaged	32
	Total Estimated Economic Losses	$56,400,000
	Total Residential Building Losses	$44,700,000
	Total Commercial, Industrial & Other Building Losses	$5,800,000
	Total Business Interruption Losses	$5,900,000
	Total Debris Generated	49,404 tons
	Truckloads (at 25 tons/truck) of building debris	206

According to information from the Connecticut Department of Emergency Management and Homeland Security, the three federally declared natural disasters of 2011 resulted in total expenses to the municipality of nearly $1.5 million. These expenses include debris and snow removal, emergency protective measures and repairs to damaged infrastructure and buildings but do not include damages experienced by private citizens and businesses.

2011 Disasters Damage Amounts Eligible for 75% Reimbursement Under FEMA Public Assistance Program				
Applicant: Municipality	**100% of Amount Eligible for 75% Reimbursement**			**Total Damages Eligible for Public Assistance Due to 2011 Disasters**
	DR-1958-CT 2011 Snow	**DR-4023-CT Irene August 2011**	**DR-4046-CT Severe Weather Oct 2011 Alfred)**	
Town of Suffield	**$48,872.01**	**$26,647.77**	**$1,411,547.33**	**$1,487,067.11**

Goals, Objectives and Strategies

In the 2008 Plan, Suffield identified the following three goals and associated objectives; however, no strategic actions were identified. For the 2014-2019 update, Suffield has articulated a number of strategic actions to pursue to meet its goals and objectives.

GOAL: PROTECT LIFE AND PROPERTY AND MINIMIZE ECONOMIC LOSSES FROM WINTER STORMS

Objective 1:
Improve the ability of public works and residents to prepare and respond to severe weather.

Strategic Actions:

1.1 Conduct periodic educational outreach to residents on storm readiness and property maintenance issues.
Lead: Emergency Management Director
Priority: Medium

Status: This is a new strategic action
Potential Funding Sources: Annual operating budget, FEMA
Timeframe: 2014-2019: Annual outreach

Objective 2*:*
Reduce the amount of debris and loss of power from severe winter storms through preventative tree maintenance.

- The town has had several thousand cubic yards of tree material removed along the roads in the past two years.

Strategic Action:

2.1 Secure contractual tree removal services and equipment prior to storm response and cleanup.
Lead: Public Works, Tree Warden
Priority: Medium
Status: This is a new strategic action
Potential Funding Sources: Annual operating budget
Timeframe: 2014-2019: Annual

GOAL: PROTECT LIFE AND PROPERTY AND MINIMIZE ROAD BLOCKAGES FROM FLOODING

Objective 1:
Reduce the likelihood of flooding by improving existing natural and artificial drainage systems.

Strategic Actions:

1.1 Amend zoning regulations to require low impact development techniques in new development.
Lead: Planning and Zoning
Priority: Medium
Status: This is a new strategic action
Potential Funding Sources: Annual operating budget
Timeframe: Expected to be completed by end of 2014

1.2 Preemptively clean debris out of select drainage structures before and during heavy storm events.
Lead: Highway Foreman
Priority: Medium
Status: This is a new strategic action. (Practice will be initiated in 2014 and carried out throughout the 2014-2019 plan period.)
Potential Funding Sources: Annual operating budget
Timeframe: 2014-2019

Objective 2:
Reduce flood threats to existing properties.

Strategic Actions:

2.1 Encourage property owners to refrain from dumping debris into stream channels and drainage culverts.
Lead: Planning and Zoning, Conservation Commission
Priority: Medium
Status: This is a new strategic action
Potential Funding Sources: Annual operating budget
Timeframe: 2014-2019: Annual outreach

2.2 Conduct a study to identify the worst areas of surface flooding and develop methods to alleviate the problem areas.
Lead: Town Engineer
Priority: Medium
Status: This is a new strategic action
Potential Funding Sources: Capital Improvement Funds
Timeframe: 2015-2016

Objective 3:
Improve maintenance of waterways and structures.

Strategic Action:

3.1 Develop inspection program for culverts and other stormwater management structures.
Lead: Public Works Director, Highway Foreman
Priority: Medium
Status: This is a new strategic action
Potential Funding Sources: Annual operating budget
Timeframe: Expect to complete first round of inspections in 2014

GOAL: PROTECT LIFE AND PROPERTY AND MINIMIZE ELECTRICAL DISRUPTIONS FROM TORNADO/HIGH WINDS

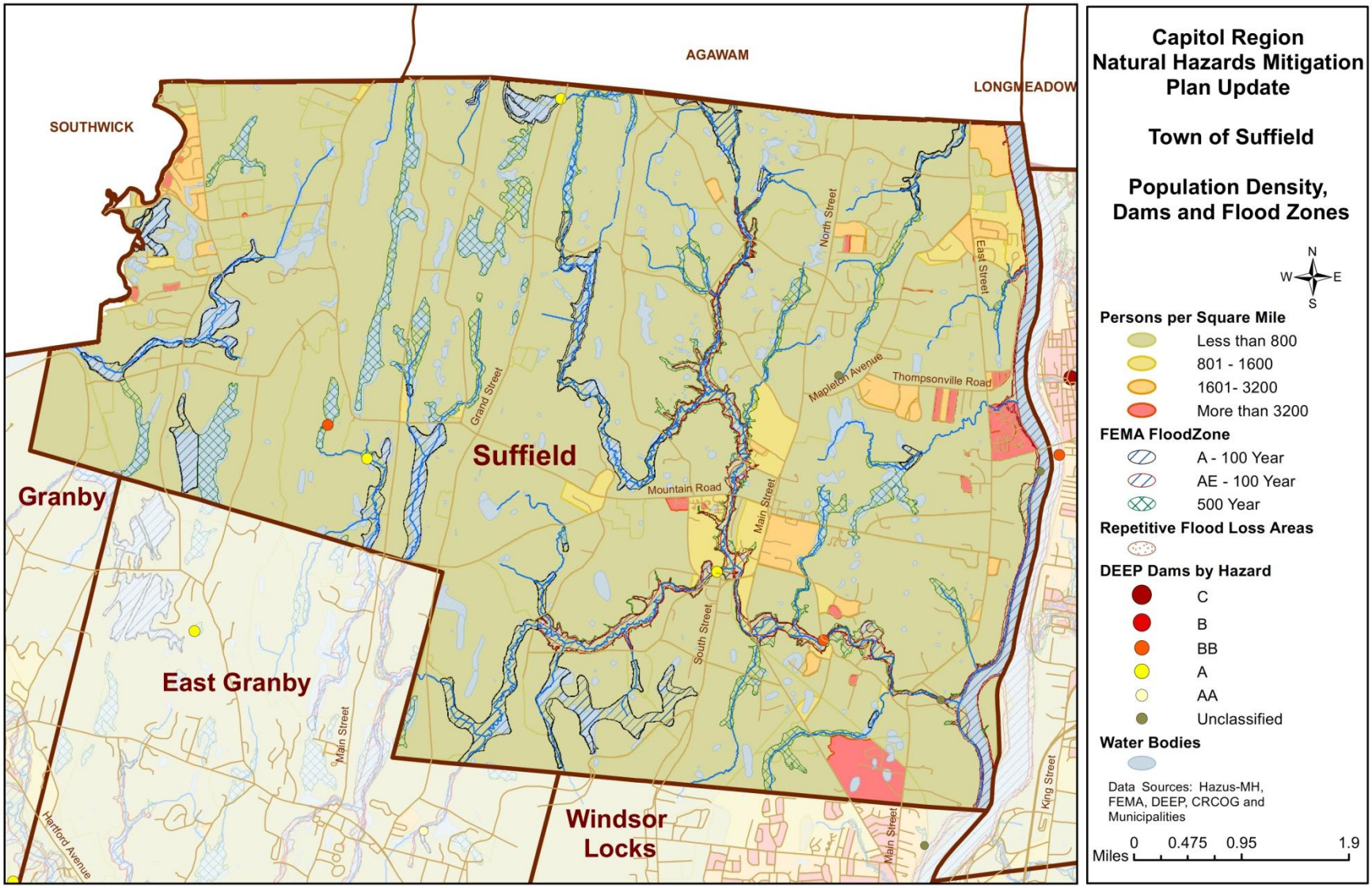
Objective 1:
Reduce the amount of debris and loss of power from severe storms through preventative tree maintenance.

Strategic Action:

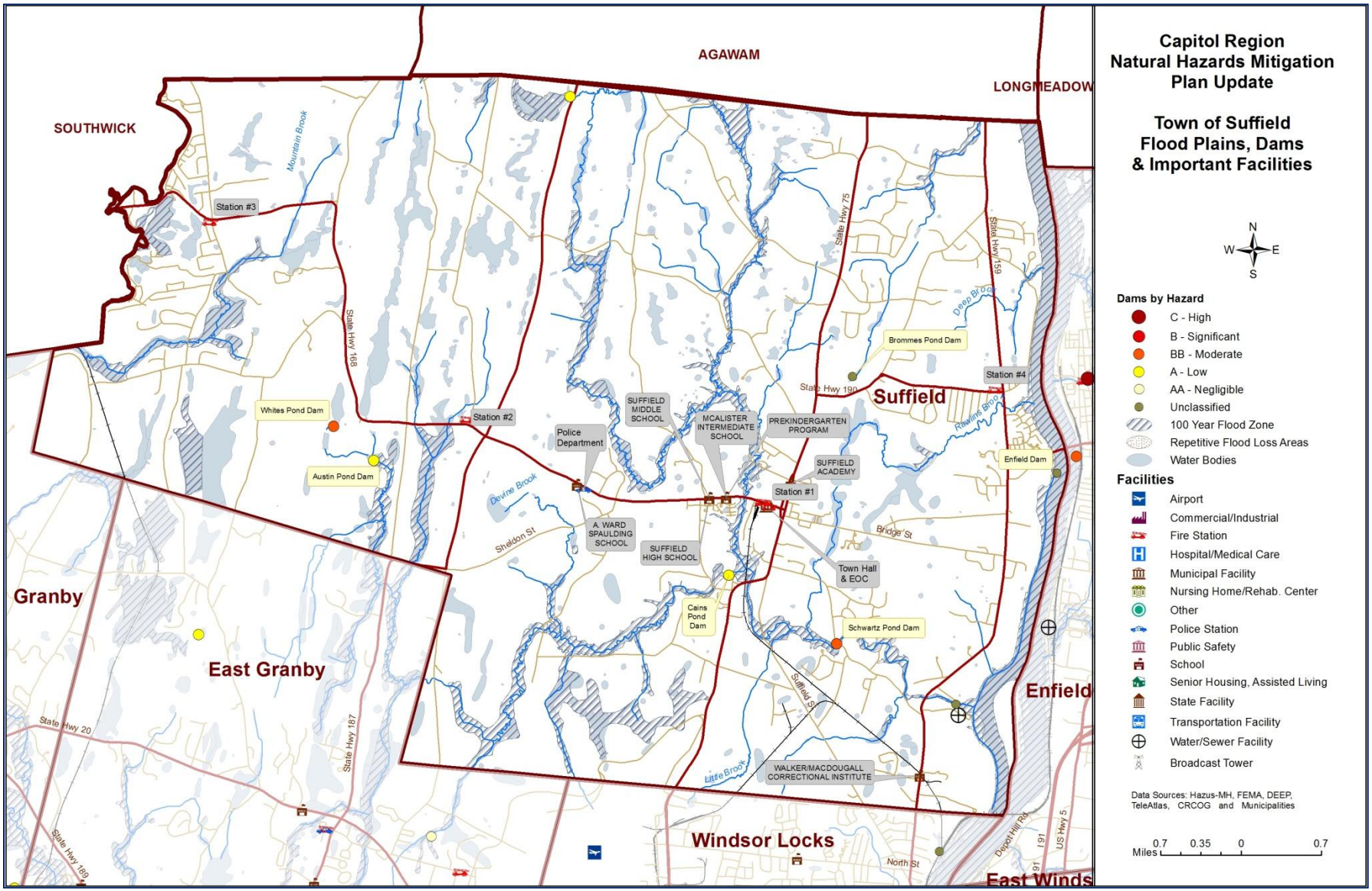
1.1 Secure contractual tree removal services and equipment prior to storm response and cleanup.

Lead: Public Works, Tree Warden
Priority: Medium
Status: This is a new strategic action
Potential Funding Sources: Annual operating budget
Timeframe: 2014-2019: Annual

Map 56: Suffield Population Density, Dams and Flood Zones



Map 57: Suffield Flood Plains, Repetitive Loss Areas, Dams and Important Facilities



Tolland

Tolland is a rural community located in the eastern portion the Capitol Region. The town has a land area of 39.7 square miles and an estimated population of 15,100. Tolland's elevation ranges from about 500 to over 1,000 feet above sea level. Its land area contributes primarily to the Willimantic River Watershed to the east, but also to the Hockanum River Watershed to the west. The Willimantic River forms the eastern boundary of Tolland, and numerous smaller watercourses flow through town, including Browns, Chapin Meadow, Charter, Clark, Clough, Green, Grover, Labonte, Polk, Spice, Sucker, and West Brooks, as well as the Skungamaug River. Interstate 84 travels east-west through Tolland. Other main state highways include routes 30, 74 and 195. Principal industry in Tolland includes manufacturing and professional services.

Challenges

There are several areas of concern in Tolland relating to natural hazards. First, problem flooding areas include several lower areas of Tolland. Over the road flooding occurs on the East end of Torry Road, Weigold Road, Gehring Road, the west end of Old Post Road, the north end of South River Road, the west end of Slater Road, and some sections of Tolland's Industrial park. Also, Del-Aire Campground is a private campground on the north end of Shenipsit Lake Road that is also a concern for flooding. Tolland has several areas of unimproved roads with varying elevations that often become washed out and need repairs during large storm surges. The Willimantic River has been known to flood over its banks during storm surges. The flooding that occurred in 2005 nearly washed out the Route 74 bridge at South River Road. State DOT and DEEP have been working on a plan to replace that bridge. Also, Gages Brook and portions of the Industrial Park are in the 100 year flood zone raising water quality concerns.

The National Flood Insurance Program has paid 10 property damage claims in Tolland totaling $9,289.54 to-date; none have been Repetitive Loss Property claims. A significant flood event could result in much damage. CRCOG used FEMA's Hazus-MH model to analyze the risks that the community might face from a major flood. The model estimates that economic losses to the town including residential and commercial damage and business interruptions due to a flood having a 1% chance of occurring any given year (the 100-year flood) would be over $ 13 million. The impacts of such a flood are summarized below:

Estimated Damages from 100-Year Flood	Households Displaced	135
	People Needing Shelter	160
	Buildings at Least Moderately Damaged	11
	Total Estimated Economic Losses	$13,400,000
	Total Residential Building & Content Losses	$8,930,000
	Total Commercial, Industrial & Other Building & Content Losses	$4,350,000
	Total Business Interruption Losses	$120,000

CRCOG also used FEMA's Hazus-MH model to analyze the risks that the Town of Tolland might face from a hurricane as powerful as the 1938 hurricane. The model estimates that economic losses to the town including residential and commercial damage and business interruptions due to such a Category 3 hurricane would be over $55 million. The impacts of such a storm are summarized below:

Estimated Damages from a 1938 Strength Hurricane	Households Displaced	none
	People Needing Shelter	none
	Buildings at Least Moderately Damaged	402
	Buildings Completely Damaged	20
	Total Estimated Economic Losses	$55,600,000
	Total Residential Building Losses	$45,440,000
	Total Commercial, Industrial & Other Building Losses	$5,240,000
	Total Business Interruption Losses	$4,910,000
	Total Debris Generated	69,111 tons
	Truckloads (at 25 tons/truck) of building debris	170

According to information from the Connecticut Department of Emergency Management and Homeland Security, the three federally declared natural disasters of 2011 resulted in total expenses to the municipality and other local agencies of over $1 million. These expenses include debris and snow removal, emergency protective measures and repairs to damaged infrastructure and buildings but do not include damages experienced by private citizens and businesses.

2011 Disasters Damage Amounts Eligible for 75% Reimbursement Under FEMA Public Assistance Program				
Applicant Town & Other (Other = Fire Districts, Schools, Private Non-Profit Agencies)	**100% of Amount Eligible for 75% Reimbursement**			**Total Damages Eligible for Public Assistance Due to 2011 Disasters**
	DR-1958-CT 2011 Snow	**DR-4023-CT Irene August 2011**	**DR-4046-CT Severe Weather Oct 2011 Alfred)**	
Town of Tolland	$93,126.72	$138,848.56	$811,818.36	$1,043,793.64
Tolland Other			$29,789.98	$29,789.98
Tolland Total	**$93,126.72**	**$138,848.56**	**$841,608.34**	**$1,073,583.62**

Tolland has a large amount of open space and brush fires are a concern. Other areas of concern are the elderly population in Town. There is one nursing home, two multi-family elderly housing complexes in Town, and one aged restricted development. Old Post Village and Winding River are the two elderly units; Old Post Village does not have generator power, while Winding River does have generator power. There are also three group homes located in Tolland. During any type of natural hazard, the Town may use three shelters for residents: the Tolland Senior Center for the elderly and the Tolland High School and Birch Grove for the general population. Tolland's Emergency Operations Center is located at the Tolland Fire Training Center. To reduce its vulnerability to natural hazards, the Town has not permitted any new construction in hazard prone areas since the adoption of the 2008 Plan.

Goals, Objectives and Strategies

GOAL: IDENTIFY AREAS AND MEASURES THAT WOULD BENEFIT FROM HAZARD MITIGATION PLANNING (WIND)

Objective 1:
Reduce conflicts between existing and utility wires and trees.

Strategic Action:

1.1 Maintain agreements with private contractors for emergency tree service work.
Lead: Public Works, Administration
Priority: Medium
Status: A contractor contact list has been established. The list will be maintained and periodically updated.
Potential Funding Source: General Fund
Timeframe: 2014-2019: annual updates are anticipated.

Update: In the 2008 Plan, the Town proposed to increase funding for preventive tree maintenance as well as maintain agreements with private contractors for emergency tree service work. Over the past several years, the Town increased its capital budget for tree trimming. Current budget is $168,830. An RFP for tree trimming was scheduled for release in July 2013.

Objective 2:
Provide back-up power for all critical facilities/infrastructure.

Strategic Action:

2.1 Secure funding for generator acquisition.
Lead: Emergency Management, Police, Fire
Priority: Medium
Status: In FY2013, the Town installed a generator at the Hicks Municipal Building and ordered new back-up generators for four other facilities (Stations 440,340, 240 and Fire Training Center). Funding for generators at additional facilities will be investigated. Availability of funding will be reassessed annually.
Potential Funding Source: bonding, grants
Timeframe: 2015-2019

Objective 3:
Ensure safe and adequate means for traveling throughout town.

Strategic Actions:

3.1 Purchase additional signs, barricades and related supplies for road closures and alternate-route marking.
Lead: Fire, Emergency Management, Public Works
Priority: Medium
Status: Will be purchased annually through operating budgets starting in FY2013-14.
Potential Funding Source: grants, general funds
Timeframe: 2014-2019

3.2 Continue good communications with public safety officials in adjacent communities.
Lead: Emergency Management, Police

Priority: Medium
Status: The Town has established mutual aid agreements with surrounding communities and will continue to maintain the good working relationships that have been established.
Potential Funding Source: General Fund
Timeframe: 2014-2019

GOAL: IDENTIFY AREAS AND MEASURES THAT WOULD BENEFIT FROM HAZARD MITIGATION PLANNING (FLOOD)

Objective 1:
Improve reliability of access to Fire Station 340.

Strategic Actions:

1.1 Analyze and make recommendations to improve Gehring Road crossing of Spice Brook.
Lead: Engineering, Public Works
Priority: Medium
Status: In FY 2012, the Town Engineering department provided technical design for the replacement of the Gehring Road culvert.

1.2 Implement recommendations of above study.
Lead: Engineering, Public Works, Administration
Priority: Medium
Status: In FY 2012, the Town replaced the Gehring Road culvert and in FY 2013, maintenance work was performed on detention basin near the Gehring Road Firehouse.

Objective 2:
Improve drainage in Industrial Park.

Strategic Actions:

2.1 Analyze and make recommendations to improve natural and artificial drainage in Industrial Park and Gages Brook.
Lead: Engineering, Public Works, Administration
Priority: Medium
Status: Initiating work with property owners in the Industrial park to improve the treatment of stormwater runoff was identified as an objective in future budgets.
Potential Funding Source: General funds
Timeframe: 2014-2019

2.2 Implement recommendations of above study.
Because this is expected to be a long term, multi-year project, for the 2014-2019 Plan period, the action to be taken is to develop a scope of work for the recommended improvements.
Lead: Engineering, Public Works, Administration
Priority: Medium
Status: Deferred until completion of study.
Potential Funding Source: Grants, General Fund, Capital Budget
Timeframe: 2018-2019

Objective 3:
Ensure safety of Depot/South River Road Bridge over the Willimantic River.

Strategic Actions:

3.1 Monitor CT DOT studies of Willimantic River.
Lead: Engineering, Public Works
Priority: High
Status: State of CT report was completed in June 2013 listing what needs to be done to bridge. Monitoring will continue.
Potential Funding Source: General Fund
Timeframe: 2014-2019

3.2 Inspect and evaluate the center pier and make recommendations for its improvement and/or maintenance.
Lead: Engineering, Public Works, Administration
Priority: High
Status: Review will occur in FY2013-14.
Potential Funding Source: Grants
Timeframe: 2014-2019

3.3 Implement recommendations of above analysis.
Because this is expected to be a long term, multi-year project, for the 2014-2019 Plan period, the action to be taken is to develop a scope of work for the recommended improvements.
Lead: Engineering, Public Works, Administration
Priority: Medium
Status: To be defined based on study.
Potential Funding Source: Grants, General Fund, Capital Budget
Timeframe: 2018-2019

Objective 4:
Prevent increased flooding as a result of future development.

Strategic Actions:

4.1 Implement Low Impact Development regulations.
Lead: Planning & Zoning
Priority: High
Status: In 2011, an LID Design Manual was developed and the zoning regulations were amended to incorporate LID. Implementation will continue primarily through the development review process and enforcement will be undertaken during construction and other inspections.
Potential Funding Source: General Fund
Timeframe: 2014-2019

4.2 Educate commissioners, developers and the community on Low Impact Development.
Lead: Planning & Zoning
Priority: Medium
Status: During the process of developing the LID Manual and LID zoning regulation amendments, several public presentations were made to explain LID concepts and the need for LID to reduce stormwater impacts. As development applications are proposed, staff will continue to educate developers, commissioners and the public on the role of and need for LID. Efforts will continue as a part of the development review process.
Potential Funding Source: General Fund
Timeframe: 2014-2019

4.3 Continue erosion and sedimentation control enforcement.
Lead: Engineering
Priority: Medium
Status: Inspections are routinely conducted as developments are constructed. This is an established practice which will continue throughout the 2014-2019 planning period.
Potential Funding Source: General Fund
Timeframe: 2014-2019

Objective 5:
Ensure protection of private property.

Strategic Actions:

5.1 Raise awareness in the community of the National Flood Insurance Program.
Lead: Emergency Management, Planning
Priority: Medium
Status: The Town has a link on its website to floodsmart.gov. Outreach efforts will continue.
Potential Funding Source: General Fund
Timeframe: 2014-2019: annual updates and outreach are anticipated.

5.2 Identify private bridges that may need repair, and reach out to owners to determine best means of evaluating and implementing necessary upgrades.
Because this is expected to be a long term, multi-year project, for the 2014-2019 Plan period, the action to be taken is to develop a scope of work for the project.
Lead: Engineering, Public Works, Administration
Priority: Medium
Status: A formal study has not yet been initiated. No significant progress has been made on this effort due to staff workloads however; this effort remains important to the Town and will be included in this update.
Potential Funding Sources: Town (for outreach to property owners), private resources (for bridge improvements)
Timeframe: 2014-2019.

Update: In the 2008 Plan, the Town also proposed to investigate participation in the Community Rating System program and to investigate purchase of the campground located on Shenipsit Lake Road. These projects were not proposed to be undertaken in the upcoming plan period. Because of the limited amount of flood losses locally ($9,289 in flood claims have been filed since the program's inception), pursuit of participation in the CRS was not considered of significant value to the community during the 2014 – 2019 planning period. Purchase of the campground was not considered a viable project for the Town over the upcoming planning period.

GOAL: REDUCE IDENTIFY AREAS AND MEASURES THAT WOULD BENEFIT FROM HAZARD MITIGATION PLANNING (STORMS)

Objective 1:
Develop network/measures to evacuate citizens to shelters

Strategic Actions:

1.1 Develop and maintain list of special needs populations
Lead: Emergency Management
Priority: High
Status: A list has been developed and includes the Del-Air campground where evacuations may be necessary at times of flooding. Addition and updates to the list will be maintained by the Fire Department.
Potential Funding Source: General Fund
Timeframe: 2014-2019: annual updates are anticipated.

1.2 Use town website to communicate emergency planning information to residents.

Lead: Emergency Management

Priority: Medium

Status: The Town posts emergency planning information on its website and has added a link to the Get Ready Capitol Region website to its home page. Periodic updates will continue. Periodic updates are made including press releases related to specific storm events. Postings will continue throughout the 2014-2019 planning period.

Potential Funding Source: General Fund

Timeframe: 2014-2019

GOAL: IDENTIFY AREAS AND MEASURES THAT WOULD BENEFIT FROM HAZARD MITIGATION PLANNING (FOREST FIRES)

Objective 1:

Reduce potential losses as a result of fires.

Strategic Actions:

1.1 Develop a system for servicing/dredging fire ponds and dry hydrants periodically.

Lead: Public Works, Fire

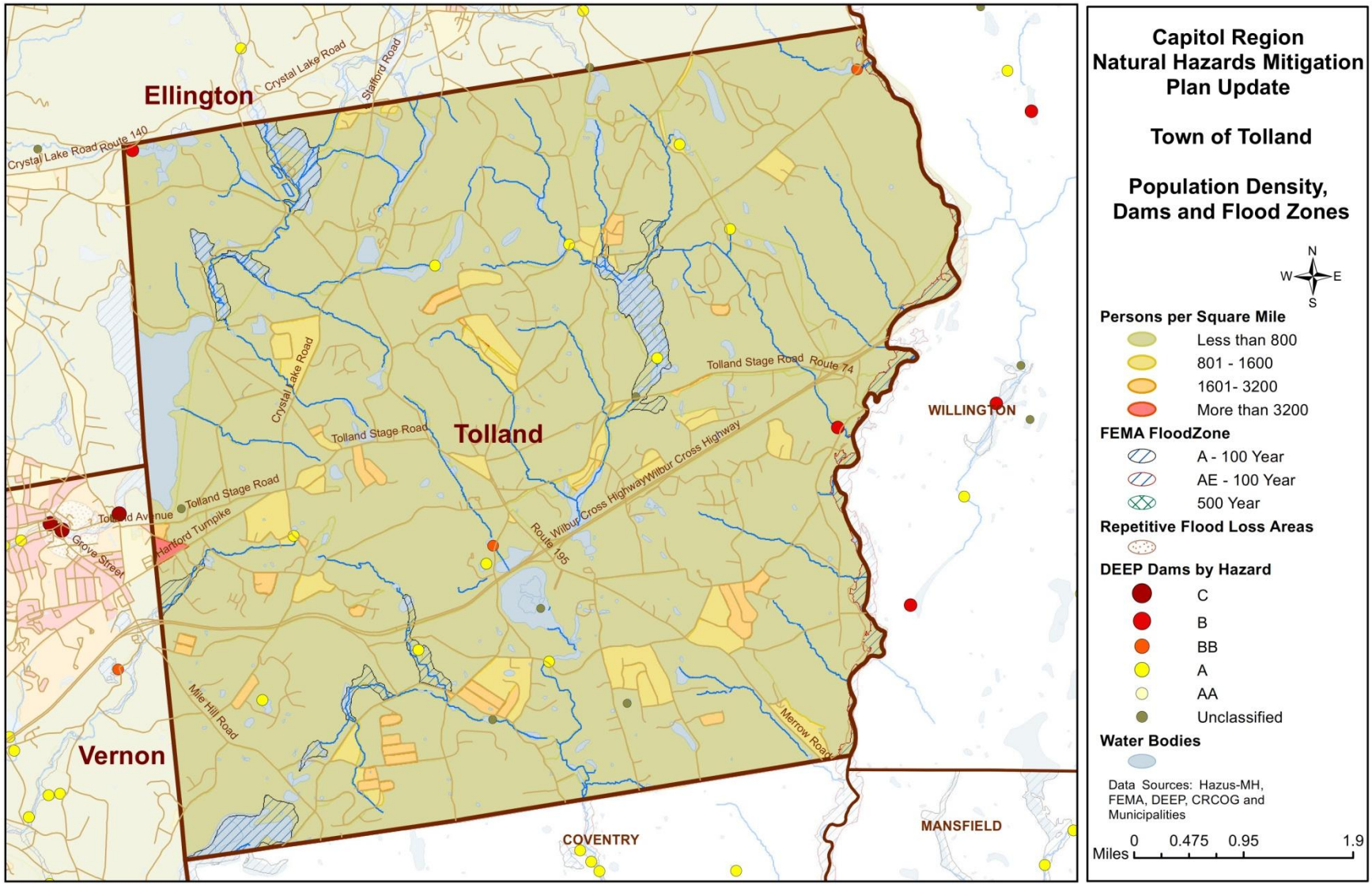
Priority: Medium

Status: Deferred: No significant progress has been made on developing a maintenance system; however, the Public Works Department periodically services dry hydrants when requested by the Fire Department.

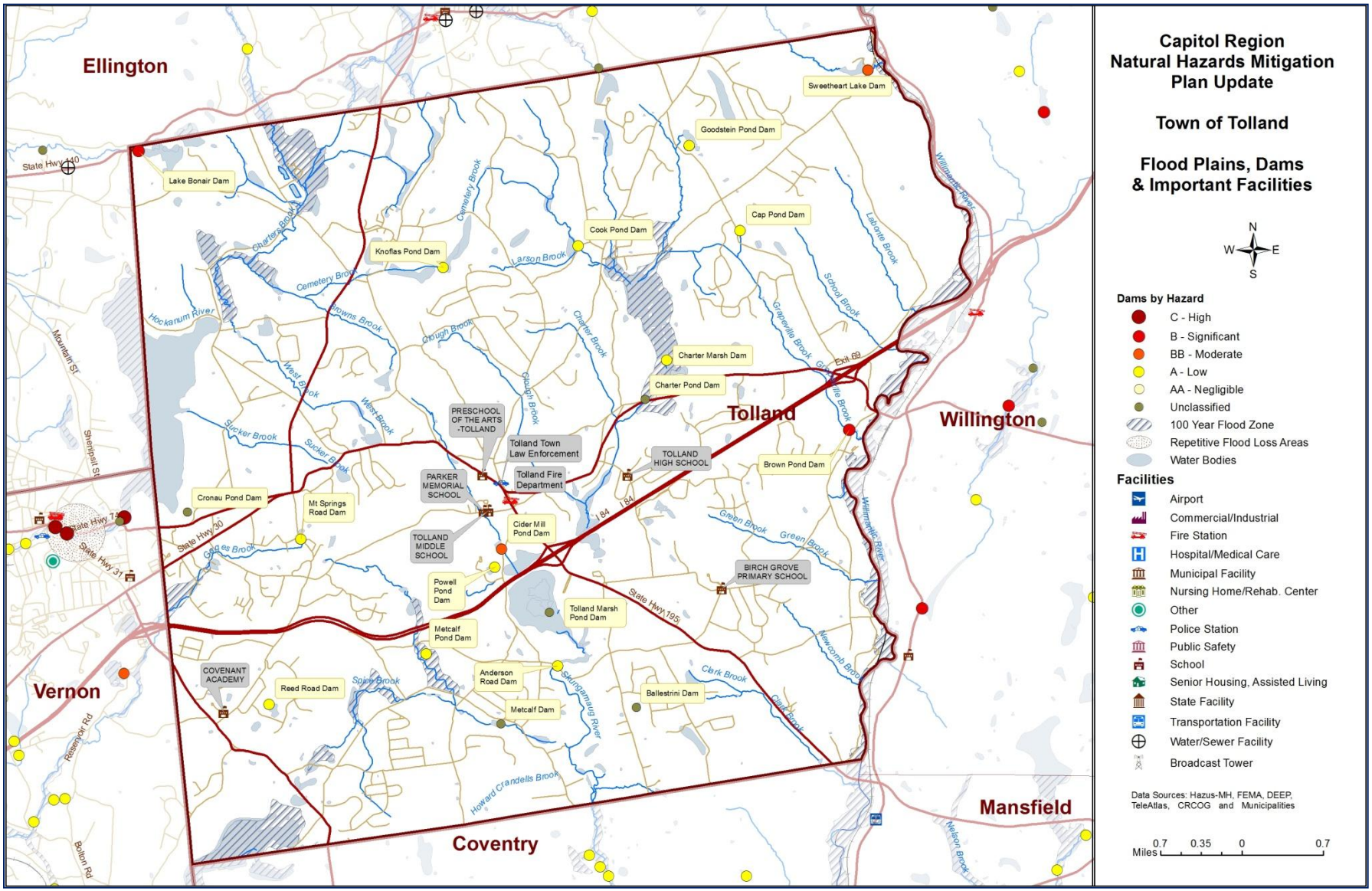
Potential Funding Source: Grants

Timeframe: 2014-2019

Map 58: Tolland Population Density, Dams and Flood Zones



Map 59: Tolland Flood Plains, Repetitive Loss Areas, Dams and Important Facilities



Vernon

The Town of Vernon is a great place to live and work with a high quality of life, desirable residential neighborhoods and schools. The town is a fully suburban community on the eastern edge of the Capitol Region and encompasses a land area of 18.4 square miles and has a population of approximately 29,622. Vernon's elevation ranges from about 150 feet in the west to over 800 feet in the east. Vernon's land area contributes primarily to the Hockanum River Watershed; however, the southeastern corner of town drains to the Willimantic River Watershed. Major watercourses include the Hockanum and Tankerhoosen Rivers, as well as Clarks and Railroad Brooks. Vernon is bisected by Interstate 84 which travels east-west. Other major thoroughfares that run through Vernon include state routes 30, 31, 74 and 83. There are distinct historic, agricultural, urban, suburban, and rural areas that provide a choice of lifestyles. A variety of cultural, recreational, and commercial activities are available throughout town offering goods and services, employment and amusement. Strong business sectors include retail, professional, medical, and commercial – industrial as well as farming and horticultural enterprises.

Challenges

Localized flooding is one challenge Vernon faces. In 2013, the Town incorporated low impact development (LID) requirements into its Zoning Regulations to aid in reducing its vulnerability to flooding. The Town has not permitted any new development in the flood plain since the adoption of the 2008 Plan. The National Flood Insurance Program (NFIP) has paid 25 claims in Vernon totaling $149,474 to-date. Vernon has eleven Repetitive Loss Property claims to-date with payments totaling $92,732. CRCOG used FEMA's Hazus-MH model to analyze the risks that the Town of Vernon might face from a major flood. The model estimates that economic losses to the town including residential and commercial damage and business interruptions due to a flood having a 1% chance of occurring any given year (the 100-year flood) would be over $50 million. The impacts of such a flood are summarized below:

Estimated Damages from 100-Year Flood	Households Displaced	336
	People Needing Shelter	805
	Buildings at Least Moderately Damaged	76
	Expected Damage to Essential Facilities	0.00
	Total Estimated Economic Losses	$50,460,000
	Total Residential Building & Content Losses	$21,920,000
	Total Commercial, Industrial & Other Building & Content Losses	$28,230,000
	Total Business Interruption Losses	$310,000

Losses from strong hurricanes would also be significant. The model estimates that economic losses to the town including residential and commercial damage and business interruptions due to a Category 3 hurricane such as the 1938 Hurricane would be nearly $140 million. The impacts of such a storm are summarized below:

Estimated Damages from a 1938 Strength Hurricane	Households Displaced	190
	People Needing Shelter	42
	Buildings at Least Moderately Damaged	1,182
	Buildings Completely Damaged	56
	Total Estimated Economic Losses	$139,900,000

	Total Residential Building Losses	$107,500,000
	Total Commercial, Industrial & Other Building Losses	$16,700,000
	Total Business Interruption Losses	$15,700,000
	Total Debris Generated	40,650 tons
	Truckloads (at 25 tons/truck) of building debris	608

According to information from the Connecticut Department of Emergency Management and Homeland Security, the three federally declared natural disasters of 2011 resulted in total expenses to the municipality of over $4 million. These expenses include debris and snow removal, emergency protective measures and repairs to damaged infrastructure and buildings but do not include damages experienced by private citizens and businesses.

2011 Disasters Damage Amounts Eligible for 75% Reimbursement Under FEMA Public Assistance Program				
Applicant Municipal & Other (Other = Fire Districts, Schools, Private Non-Profit Agencies)	**100% of Amount Eligible for 75% Reimbursement**			**Total Damages Eligible for Public Assistance Due to 2011 Disasters**
	DR-1958-CT 2011 Snow	**DR-4023-CT Irene August 2011**	**DR-4046-CT Severe Weather Oct 2011 Alfred)**	
Town of Vernon	$106,773.87	$142,079.05	$3,805,918.87	$4,054,771.79
Vernon Other	$5,819.71			$5,819.71
Vernon Total	**$112,593.58**	**$142,079.05**	**$3,805,918.87**	**$4,060,591.50**

Goals, Objectives and Strategies

GOAL: PRESERVATION OF LIFE AND PROPERTY

Objective 1:
Improve snow removal equipment at public works.

Strategic Action:

1.1 Incorporate needs in Capital Improvement Plan and pursue opportunities to upgrade equipment.
Lead: Public Works, Administration
Priority: Medium
Status: The Town of Vernon has adopted a vehicle and equipment replacement plan and has begun a multi-year fleet replacement program. This effort will continue throughout the 2014-2019 Plan.
Potential Funding Sources: Grants, capital improvement and general operating budget.
Timeframe: 2014-2019: Annual purchase through capital improvements and budget process as well as application for grant funding as available.

Objective 2:
Provide police/fire/EMS with dedicated 4-wheel drive vehicles.

Strategic Action:

2.1 Pursue opportunities to obtain vehicles - through grants, surplus military equipment, etc.
Lead: Police and Fire
Priority: Medium
Status: Completed. The following vehicles have been purchased or have been approved for purchase by department: VPD = 4 SUV's; VFD = 1 SUV (Fire Marshal), 1 SUV (Command Vehicle), 1 Utility F-150, 2 ATV's; DPW = 5 F-250's, 1 Ford Escape; Public Schools = 1 F-250, 1 Ford Escape, 2 Kubotas (pre-positioned at schools to support primary and secondary shelter operations).

Objective 3:
Provide public works with mobile generator to power shelters.

Strategic Action:

3.1 Work with CREPC to identify grant programs for purchasing portable generators and modifying buildings for hook-up.
Lead: Emergency Management, Police
Priority: High
Status: The Office of Emergency Management (OEM) purchased the following portable generators: (2) 7kw, (1) 3kw, (2) 2kw. OEM secured a state homeland security grant to purchase and install a fixed generator at Vernon Center Middle School (primary shelter). Vernon Public Schools purchased and installed a fixed generator at Rockville High School (secondary shelter). This effort will continue for the 2014-2019 plan with a focus on securing grant funding for a fixed generator for the Town of Vernon's Town Hall and Annex buildings (secondary EOC and town-wide IT network) and a fixed generator for Fire Station #5. Applications for grant funding will be made as opportunities become available through state and federal programs
Potential Funding Sources: Grants and general operating budget.
Timeframe: 2014 – 2019

Objective 4:
Ensure emergency preparedness of residents and businesses.

Strategic Actions:

4.1 Conduct periodic educational outreach to residents on storm readiness and property maintenance issues.
Lead: Public Works, Emergency Management, Police

Priority: High
Status: This is an established practice utilizing Everbridge (R-911), town website, and mass media to educate residents. Host public forums (i.e. CRCOG). DPW provides specific information to residents on property maintenance and keeping road gutters clear. This effort will continue for the 2014-2019 Plan.
Potential Funding Sources: Grants and general operating budget.
Timeframe: 2014 – 2019: annual outreach

4.2 Conduct periodic outreach to private medical-care facilities and apartment complexes to encourage installation of generators.
Lead: Emergency Management, Building
Priority: Medium
Status: This is an established practice. Vernon Housing Authority included in Town of Vernon emergency operations at EOC. Worked with local medical facilities to review and exercise plans as well as to authorize priority electrical utility restoration with CL&P.
Potential Funding Sources: Grants and general operating budget.
Timeframe: 2014 – 2019: annual outreach

4.3 Complete the requirements to join FEMA's Community Rating System to reduce flood insurance premiums for residents.
Lead: Planning, Emergency Management
Priority: Medium
Status: Deferred. The Town of Vernon will join the rating system and a community information program will be established as part of the 2014-2019 Plan.
Potential Funding Sources: Grants and general operating budget.
Timeframe: 2015-2016.

GOAL: IMPLEMENT PREVENTATIVE PROGRAMS TO MITIGATE STORM DAMAGE

Objective 1:
Purchase and implement GIS mapping program.

Strategic Actions:

1.1 Continue planning to implement GIS for use by all town departments, including emergency services.
Lead: Planning, Administration, Emergency Management
Priority: Medium
Status: Established a GIS program that was utilized to support EOC operations during storms, specifically with coordinating school roof snow removal and road clearing operations.
Potential Funding Sources: Grants and general operating budget.
Timeframe: 2014-2019.

Objective 2:
Maintain adequate manpower and equipment for preventative tree program and assessment.

Strategic Action:

2.1 Investigate CRCOG service sharing initiative for opportunities to share equipment used in tree maintenance.
Lead: Public Works, Administration
Priority: Medium
Status: The Town of Vernon purchased a 60 foot bucket truck, (12) new chain saws, and has added grapple apparatus to a loader, Bobcat and steer loader. Additional requested equipment includes a high capacity chipper, grapple truck and chip dump truck.
Potential Funding Sources: Grants, capital improvement and general operating budget.
Timeframe: 2014-2019.

Objective 3:
Make improvements to town Emergency Operations Center and communications facility.

Strategic Action:
3.1 Acquire telephones, computer server and back-up, mobile hand-held radios and enable wireless connections.
Lead: Police, Fire, Emergency Management
Priority: Medium
Status: Efforts are underway. The Town of Vernon has implemented several improvements to its Emergency Operations Center (EOC), specifically in the areas of information technology and communications. In addition, the Town of Vernon has established a specific IT plan for EOC operations and is in the process of establishing a dedicated HAM radio operations room. The Town of Vernon is also exploring the possibilities of a unified/co-located (VFD and VPD) dispatch center during emergencies.
Potential Funding Sources: Grants and general operating budget.
Timeframe: HAM radio room to be completed by the end of FY2015.

NEW OBJECTIVE:
Objective 4:
Obtain weather and water level monitoring and alerting systems.

Strategic Actions:

1.1 Acquire weather monitoring system that provides real-time data and alerts to inform critical decision making for emergency preparedness and response operations.
Lead: Emergency Management

Priority: High
Status: This is a new initiative for the Plan Update. The Office of Emergency Management (OEM) is exploring internet based streaming weather monitoring systems.
Potential Funding Sources: Grants and general operating budget.
Timeframe: To be completed by the end of FY2013/14.

1.2 Acquire water level monitoring system that provides real-time data and alerts to inform critical decision making for emergency preparedness and response operations. Because this is expected to be a long term, multi-year project, for the 2014-2019 Plan period, the action to be taken is to review available systems and grant funding options.
Lead: Emergency Management, Public Works
Priority: Medium
Status: This is a new initiative for the Plan Update.
Potential Funding Sources: Grants and general operating budget.
Timeframe: 2014–2019

GOAL: IMPROVE DRAINAGE IN FLOOD ZONES

Objective 1:
Conduct study of existing drainage problem areas for improvements.

Strategic Actions:

1.1 Study improvements to Franklin Road to alleviate road flooding issues. (The Town made claims for FEMA assistance in repair costs following the October 2005 flood). Because this is expected to be a long term, multi-year project, for the 2014-2019 Plan period, the action to be taken is to develop a scope of work and Request for Proposal (RFP) for the study.
Lead: Engineering, Public Works
Priority: Medium
Status: Deferred. Study has yet not been completed. No significant progress made on this effort however, it remains important to the Town.
Potential Funding Sources: Grants and general operating budget.
Timeframe: 2018-2019

1.2 Study improvements to Manchester Flats area - Route 83, Welles and Main Streets. (During the October 2005 flood, a motel on Rt. 83 became inaccessible, isolating guests.) Because this is expected to be a long term, multi-year project, for the 2014-2019 Plan period, the action to be taken is to develop a scope of work and Request for Proposal (RFP) for the study.
Lead: Engineering, Public Works
Priority: Medium
Status: Deferred. Study has yet not been completed. No significant progress made on this effort however, it remains important to the Town.
Potential Funding Sources: Grants and general operating budget.
Timeframe: 2018-2019

1.3 Study improvements along Frederick Road. (Residents in area currently carry flood insurance and have utilized town sandbags during high water events.) Because this is expected to be a long term, multi-year project, for the 2014-2019 Plan period, the action to be taken is to develop a scope of work and Request for Proposal (RFP) for the study.

Lead: Engineering, Public Works
Priority: Medium
Status: Deferred. Study has yet not been completed. No significant progress made on this effort however, it remains important to the Town.
Potential Funding Sources: Grants and general operating budget.
Timeframe: 2018-2019

Objective 2:
Upgrade or repair identified problem areas.

Strategic Action:

2.1 Upon completion of above studies, prioritize and implement recommended improvements. Because this is expected to be a long term, multi-year project, for the 2014-2019 Plan period, the action to be taken is to develop a prioritized list of projects.

Lead: Engineering, Public Works, Administration
Priority: Medium
Status: Deferred until completion of studies.
Potential Funding Sources: Grants and general operating budget.
Timeframe: By fall of 2019

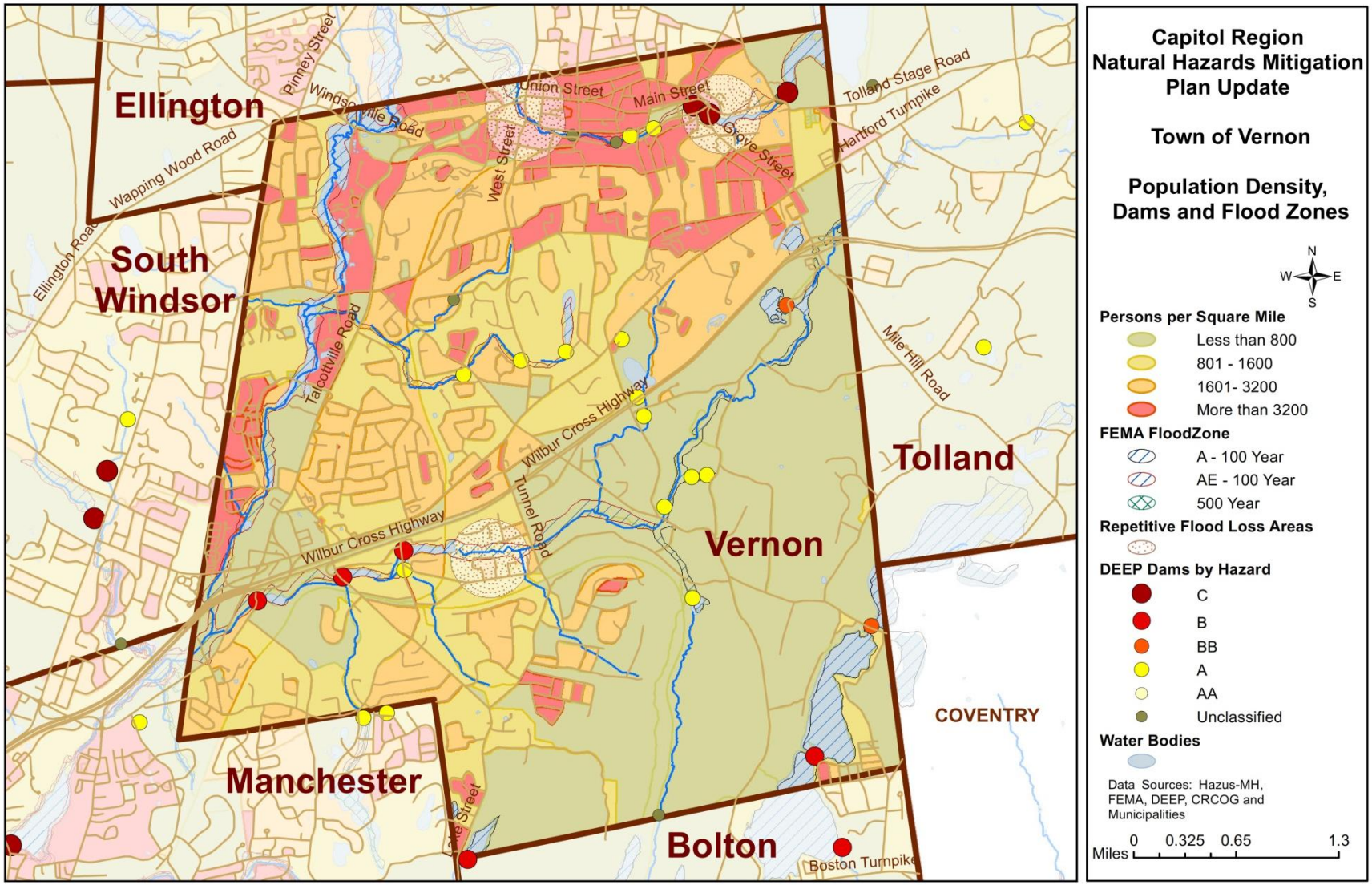
Objective 3:
Obtain public notification system.

Strategic Action:

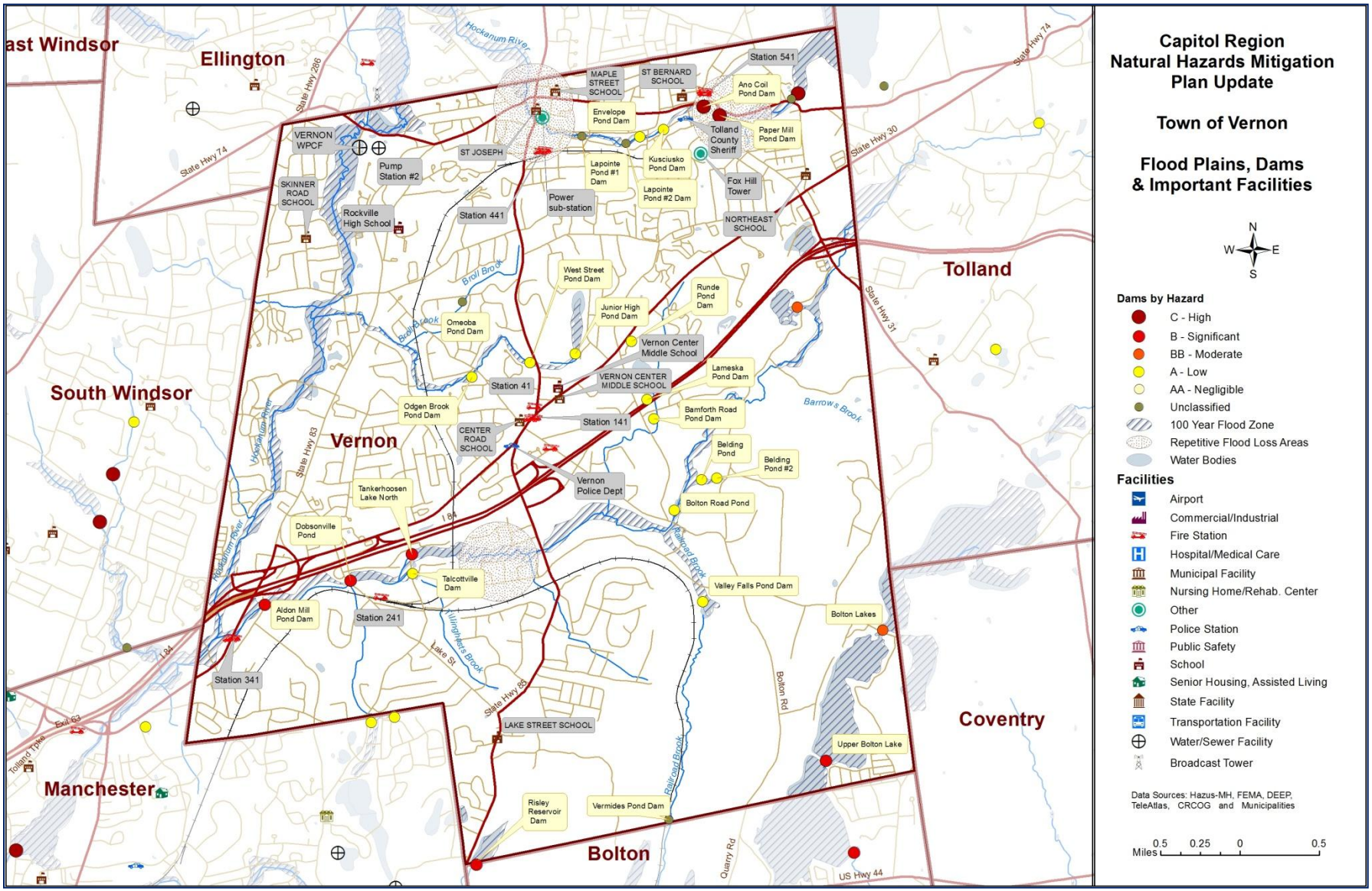
3.1 Improve public notification system.

Lead: Emergency Management, Police
Priority: Medium
Status: The Town of Vernon subscribes to the state's Everbridge/ Reverse-911 public notification system. The Town of Vernon has also upgraded its current public warning siren system to include portable/handheld radio activation and voice announcement capabilities. System improvements will continue for the 2014-2019 Plan with a focus on expanding the public warning siren system to the northeast and southeast corners of the town.
Potential Funding Sources: Grants, capital improvements, and general operating budget.
Timeframe: 2014 – 2019.

Map 60: Vernon Population Density, Dams and Flood Zones



Map 61: Vernon Flood Plains, Repetitive Loss Areas, Dams and Important Facilities



West Hartford

West Hartford is a fully suburbanized community located in Hartford County that encompasses a land area of 22 square miles. It is a largely residential community with a population of approximately 63,300. The major transportation routes that travel through West Hartford include Interstate 84, State Routes 4, 44, 71, 173, 185, 189 and 218. The Town hosts the University of Hartford, University of St. Joseph, American School for the Deaf, and the Hartford Branch of the University of Connecticut. About 21% of the Town's non-agricultural employment is in manufacturing. The Town has several large established commercial districts.

West Hartford is within the Park River Watershed, and contains several reservoirs that supply the Metropolitan District Commission's system. Major watercourses in town include Meadow, Piper, Rockledge, Trout, and Tumbledown Brooks, and the North Branch of the Park River.

Existing Strategies

The Town has experienced significant flooding events in the past and has worked to mitigate the problem over the course of many years. The Town of West Hartford undertook significant structural mitigation projects in the early 1980s, including rechanneling the Trout Brook to remove 238 houses from the floodplain.

The National Flood Insurance Program has paid 318 property damage claims in West Hartford totaling $1,171,709.48 to-date. The NFIP has paid out has 91 Repetitive Loss Property claims on 34 properties in West Hartford to-date. These claims have totaled over $712,392. In 2001, the Town adopted a Repetitive Flood Loss Plan, and has consistently worked to implement the action plan contained within. The Town periodically ensures that repetitive flood loss property owners have adequate information for retro-fitting flood-prone structures. The Town also holds regular meetings with residents to provide technical advice on flood protection and flood preparedness. In 2008, in order to remain eligible for participation in the National Flood Insurance Program, the Town revised its floodplain ordinance using adopting language that meets or exceeds federal or state requirements. The revised ordinance improves the Town's ability to restrict new development in flood prone areas.

Since 2008, the Town's Inland Wetlands and Watercourses Commission has approved ten (10) separate regulated activities in areas either identified as floodplain or wetlands. Most of these approvals were for work in regulated inland wetlands areas outside of the floodplain. The Commission approved construction of a multi-family residential building and several commercial and accessory structures outside the floodplain in inland wetland regulated areas, as well as several minor structural renovations and site improvements in regulated areas in accordance with the flood hazard reduction and resource compensation standards outlined in the Zoning Ordinance and Inland Wetlands and Watercourses Regulations. No new structures were approved in the special flood hazard area. Portions of a parking lot and access drives were approved in a 500 year floodplain. These permitted activities did not result in increased vulnerabilities to flooding and in some cases reduced the community's flood risk. For example, permitted activities included structural stormwater drainage improvements, stream bank stabilization and removal of sediment and debris in floodplain and wetlands that help mitigate flood risks.

Some of the remaining flooding issues in West Hartford result from sanitary sewer service back-ups. The Metropolitan District Commission owns and operates the sewer system in West Hartford. The Clean Water Project should alleviate overflow problems in this area.

Challenges

Despite these efforts, flooding continues to be a major concern for the Town. A significant flood event could result in substantial damage in the community. CRCOG used FEMA's Hazus-MH model to analyze the risks that the Town of West Hartford might face from a major flood. The model estimates that economic losses to the town including residential and commercial damage and business interruptions due to a flood having a 1% chance of occurring any given year (the 100-year flood) would be nearly $131 million. The impacts of such a flood are summarized below:

Estimated Damages from 100-Year Flood	Households Displaced	893
	People Needing Shelter	2,004
	Buildings at Least Moderately Damaged	140
	Expected Damage to Essential Facilities	One school could sustain moderate damage
	Total Estimated Economic Losses	$130,710,000
	Total Residential Building & Content Losses	$49,140,000
	Total Commercial, Industrial & Other Building & Content Losses	$80,830,000
	Total Business Interruption Losses	$740,000

In addition to flooding, hurricanes and severe winter storms can also create significant impacts to the Town and its residents and businesses. CRCOG also used FEMA's Hazus-MH model to analyze the risks that the Town of West Hartford might face from a hurricane as powerful as the 1938 hurricane. The model estimates that economic losses to the town including residential and commercial damage and business interruptions due to such a Category 3 hurricane would be over $355 million. The impacts of such a storm are summarized below:

Estimated Damages from a 1938 Strength Hurricane	Households Displaced	178
	People Needing Shelter	36
	Buildings at Least Moderately Damaged	2,358
	Buildings Completely Damaged	138
	Total Estimated Economic Losses	$355,325,000
	Total Residential Building Losses	$265,371,000
	Total Commercial, Industrial & Other Building Losses	$53,553,000
	Total Business Interruption Losses	$36,402,000
	Total Debris Generated	56,362 tons
	Truckloads (at 25 tons/truck) of building debris	1271

According to information from the Connecticut Department of Emergency Management and Homeland Security, the three federally declared natural disasters of 2011 resulted in total expenses to the municipality and local private nonprofit agencies of nearly $11 million. These expenses include

debris and snow removal, emergency protective measures and repairs to damaged infrastructure and buildings but do not include damages experienced by private citizens and businesses.

2011 Disasters Damage Amounts Eligible for 75% Reimbursement Under FEMA Public Assistance Program				
Applicant: Town & Other (Other = Fire Districts, Schools, Private Non-Profit Agencies)	100% of Amount Eligible for 75% Reimbursement			
	DR-1958-CT 2011 Snow	DR-4023-CT Irene August 2011	DR-4046-CT Severe Weather Oct 2011 Alfred)	Total Damages Eligible for Public Assistance Due to 2011 Disasters
Town of West Hartford	$224,752.76	$111,036.05	$10,423,313.83	$10,759,102.64
West Hartford Other	$11,074.33	$1,630.43	$86,759.95	$99,464.71
West Hartford Total	**$235,827.09**	**$112,666.48**	**$10,510,073.78**	**$10,858,567.35**

Goals, Objectives and Strategies

In the 2008 Plan, West Hartford identified a single goal, objective and strategy with a focus on reducing flood losses:

GOAL: MINIMIZE LOSS OF LIFE AND PROPERTY FROM NATURAL HAZARDS

Objective 1:
Reduce risk to flood-prone structures.

Strategic Action:

1.1 Continue to implement Repetitive Flood Loss Plan.
Lead: Various
Priority: High
Status: The Town has consistently worked to implement the Repetitive Flood Loss Plan's action plan. The Town periodically ensures that repetitive flood loss property owners have adequate information for retro-fitting flood-prone structures and holds regular meetings with residents to provide technical advice on flood protection and flood preparedness. In addition, the Town has identified a storm water management program in its Capital Improvements Program. The storm water management program includes repair and replacement of storm sewers as part of street reconstruction or resurfacing projects. Storm sewers are also replaced or improved as a result of flooding complaints or roadway failures.
Funding Source: Bonds are issued to fund the storm water management program
Timeframe: 2014-2019: Recurring: annual evaluations of projects will be undertaken during budget process.

In reassessing and evaluating the 2008 Plan, West Hartford modified its goal statement and identified three additional objectives and twelve mitigation projects for the upcoming five years:

GOAL: MINIMIZE LOSS TO CRITICAL INFRASTRUCTURE AND REDUCE LOSS OF LIFE, PROPERTY AND ECONOMIC CONSEQUENCES AS A RESULT OF NATURAL DISASTERS.

Objective 2:
Improve the ability of town to provide emergency sheltering for at least 6,000 residents.

Strategic Actions:

2.1 Install generators at all primary and tertiary shelters and designated alternate care sites.
Lead: Facilities Management
Priority: High
Status: This is a new initiative
Potential Funding Sources: grants, bonding
Timeframe: 2014-2016

2.2 Increase sheltering supplies (cots, water, food, etc.).
Lead: Emergency Management
Priority: High
Status: This is a new initiative to be undertaken in partnership with the American Red Cross
Potential Funding Sources: operating budget, grants
Timeframe: 2014-2015

2.3 Ensure and supply transportation access to emergency shelters.
Lead: Emergency Management, Board of Education
Priority: High
Status: This is a new initiative
Potential Funding Sources: operating budget, grants
Timeframe: 2014-2017

2.4 Ensure ability of the town to safely shelter in place, and when necessary, evacuate residents and visitors.
Lead: Emergency Management, Fire, Police, Community Services
Priority: High
Status: This is a new initiative
Potential Funding Sources: operating budget, grants
Timeframe: 2014-2017

2.5 Establish pet sheltering alternatives.
Lead: Emergency Management, Animal Control, Public Health, Facilities Management
Priority: Low
Status: This is a new initiative
Potential Funding Sources: operating budget, grants
Timeframe: 2014-2017

Objective 3:
To reinforce, renovate and upgrade existing critical town facilities and support facilities.

Strategic Actions:

3.1 Implement needed improvements to the Emergency Operations Center to withstand high wind and other natural and manmade disasters.
Lead: Emergency Management, Facilities Management
Priority: High
Status: This is a new initiative, however work has been initiated. An architect is on retainer and has begun design.
Potential Funding Sources: operating budget, bonding
Timeframe: 2014-2016

3.2 Upgrade and enhance operational equipment in Emergency Operations Center including radio communications, satellite communications and visual display media.
Lead: Emergency Management, Police, Fire
Priority: Medium
Status: This is a new initiative
Potential Funding Sources: operating budget
Timeframe: 2014-2018

3.3 Identify and establish a secondary Emergency Operations Center.
Lead: Emergency Management, Facilities Management
Priority: Medium
Status: This is a new initiative
Potential Funding Sources: grants
Timeframe: To be completed by 2016

3.4 Work with local fuel stations to ensure adequate emergency generating equipment for emergency response vehicles.
Lead: Emergency Management, Community Services

Priority: Medium
Status: This is a new initiative
Potential Funding Sources: operating budget
Timeframe: 2013-2016

Objective 4:
Increase training for hazard response to town employees, volunteers and emergency services personnel.

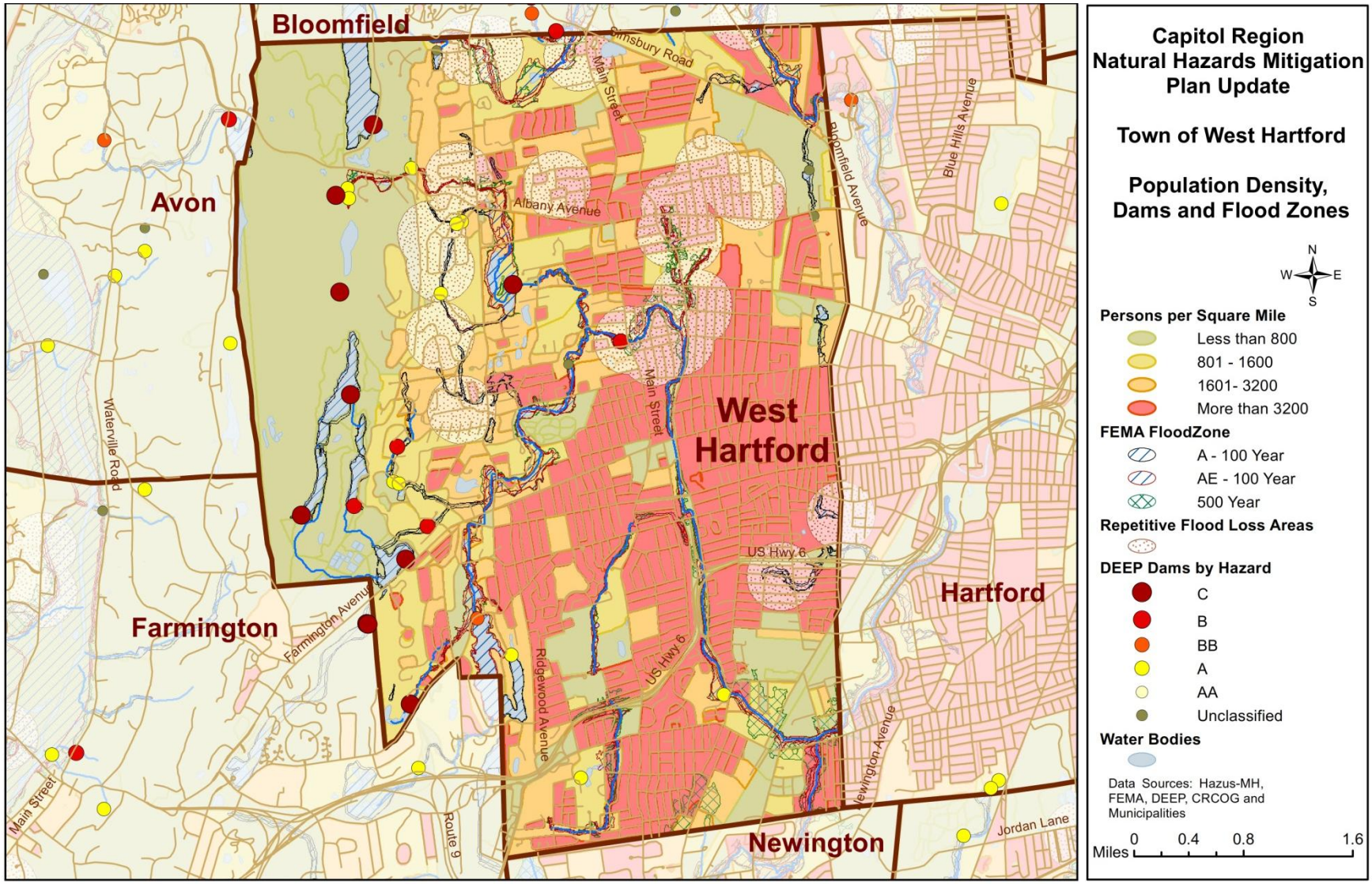
Strategic Actions:

4.1 Provide Incident Command training to all personnel for position and function.
Lead: Emergency Management, Police, Fire
Priority: Medium
Status: This is a new initiative
Potential Funding Sources: operating budget
Timeframe: Training to be undertaken annually 2014-2019

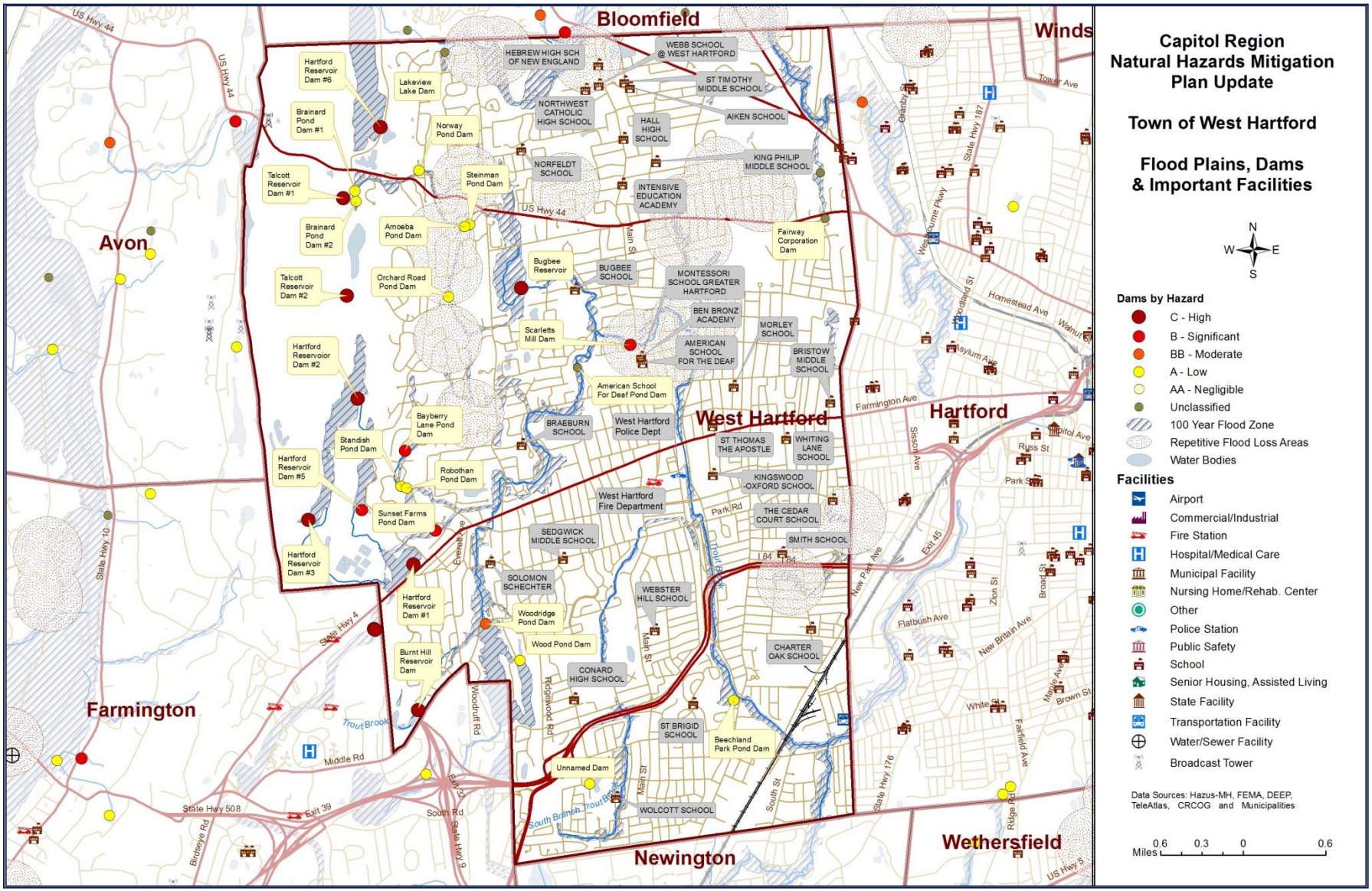
4.2 Provide shelter management training to all personnel for position and function.
Lead: Emergency Management, Police, Fire
Priority: Medium
Status: This is a new initiative
Potential Funding Sources: operating budget
Timeframe: Training to be undertaken annually 2014-2018

4.3 Provide specific incident action plan development training to positions and functions of EOC representatives.
Lead: Emergency Management, Police, Fire
Priority: Medium
Status: This is a new initiative
Potential Funding Sources: operating budget
Timeframe: Training to be undertaken annually 2014-2019

Map 62: West Hartford Population Density, Dams and Flood Zones



Map 63: West Hartford Flood Plains, Repetitive Loss Areas, Dams and Important Facilities



Wethersfield

Wethersfield is located in the south-central portion of the Capitol Region. It encompasses a land area of 12.4 square miles and has a 2010 population of approximately 26,668. Wethersfield's land area contributes primarily to the main stem of the Connecticut River Watershed, although the northeast corner drains to the Park River Watershed. The Connecticut River flows along the eastern boundary. Other watercourses include Beaver, Folly, Two Stone, Collier and Goff Brooks. Wethersfield has several major transportation routes that run through town and intersect within its borders. These include Interstate 91 and State routes 3, 5/15, 99, 175, 287, and 314. Principal industries include professional offices, restaurants, retail, Kell-Strom, printing, several medical offices, and numerous state offices including Connecticut Departments of Corrections, Judicial, Labor Department and Motor Vehicles.

Challenges

Flooding is a major concern in Wethersfield. Thirty percent of the land area of the Town lies within the 100-year floodplain. Much of this area is within the Connecticut River's flood plain and is zoned for agricultural use. The Agricultural (AG) Zone limits permitted uses to those normally associated with farming, open space and municipal recreation. A limited number of other uses are allowed by special permit only in this zone. Other floodplain areas in the Town are generally associated with watercourses such as Folly, Beaver, Cemetery and Goff Brooks. The Town has initiated and completed a number of drainage improvements to address localized flooding and continues to address problem areas primarily through the capital improvements program which is reconsidered annually in the budget process. Since the adoption of the 2008 Plan, the Town has not permitted any new homes within the 100 year floodplain. Applications for construction of minor improvements such as decks or lot grading have been permitted contingent on no loss of flood storage.

The National Flood Insurance Program has paid 66 property damage claims in Wethersfield totaling $340,703 to-date. Also, nine Repetitive Loss Property claims on four properties in Wethersfield have been paid to-date totaling $27,375. CRCOG used FEMA's Hazus-MH model to analyze the risks that the Town of Wethersfield might face from flooding. The model estimates that economic losses to the town including residential and commercial damage and business interruptions due to a flood having a 1% chance of occurring any given year (the 100-year flood) would be nearly $21 million. The impacts of such a flood are summarized below:

Estimated Damages from 100-Year Flood	Households Displaced	238
	People Needing Shelter	518
	Buildings at Least Moderately Damaged	7
	Expected Damage to Essential Facilities	0.00
	Total Estimated Economic Losses	$20,960,000
	Total Residential Building & Content Losses	$7,280,000
	Total Commercial, Industrial & Other Building & Content Losses	$13,560,000
	Total Business Interruption Losses	$120,000

The impacts of hurricanes, tropical storms, and winter storms are also a concern for the Town. According to information from the Connecticut Department of Emergency Management and Homeland

Security, the three federally declared natural disasters of 2011 resulted in total expenses to the municipality and local and private nonprofit agencies of $1,638,804. These expenses include debris and snow removal, emergency protective measures and repairs to damaged infrastructure and buildings but do not include damages experienced by private citizens and businesses.

2011 Disasters Damage Amounts Eligible for 75% Reimbursement Under FEMA Public Assistance Program				
Applicant: Municipality and Other (i.e., Fire Districts, Schools, Private Non-Profit Agencies)	**100% of Amount Eligible for 75% Reimbursement**			**Total Damages Eligible for Public Assistance Due to 2011 Disasters**
	DR-1958-CT 2011 Snow	**DR-4023-CT Irene August 2011**	**DR-4046-CT Severe Weather Oct 2011 (Alfred)**	
Town of Wethersfield	$114,269.56	$152,522.68	$1,243,730.14	$1,510,522.38
Wethersfield Other	$4,222.19	$2,120.45	$121,939.41	$128,282.05
Wethersfield Total	**$118,491.75**	**$154,643.13**	**$1,365,669.55**	**$1,638,804.43**

CRCOG also used FEMA's Hazus-MH model to analyze the risks that the Town of Wethersfield might face from a hurricane as powerful as the 1938 hurricane. The model estimates that economic losses to the town including residential and commercial damage and business interruptions due to such a Category 3 hurricane would be nearly $154 million. The impacts of such a storm are summarized below:

Estimated Damages from a 1938 Strength Hurricane	Households Displaced	74
	People Needing Shelter	16
	Buildings at Least Moderately Damaged	1,280
	Buildings Completely Damaged	95
	Total Estimated Economic Losses	$154,000,000
	Total Residential Building Losses	$121,653,000
	Total Commercial, Industrial & Other Building Losses	$15,500,000
	Total Business Interruption Losses	$16,680,000
	Total Debris Generated	30,500 tons
	Truckloads (at 25 tons/truck) of building debris	582

Goals, Objectives and Strategies

The Town of Wethersfield reviewed the Goals, Objectives and Strategies proposed in the 2008 Plan and determined that all previous goals, objectives and mitigation projects should remain. In addition, the Town proposed to initiate several additional strategic actions for the upcoming five years.

GOAL: REDUCE LOSS OF LIFE, PROPERTY DAMAGE AND ECONOMIC CONSEQUENCES AS A RESULT OF WINTER STORMS

Objective 1:
Improve the ability of public works to prepare and respond to severe weather.

Strategic Actions:

1.1 Replace/enlarge sand/salt storage facility.
Lead: Public Works, Administration
Priority: Medium
Status: Funds for design and site preparation were identified in the 2013-14 CIP
Potential Funding Sources: Local CIP funds
Timeframe: Completion by 2016

1.2 Expand capacity for public works trucks and equipment storage. Because this is expected to be a long term, multi-year project, for the 2014-2019 Plan period, the action to be taken is to develop a scope of work for this project.
Lead: Public Works, Administration
Priority: Medium
Status: Deferred. Not presently funded
Potential Funding Sources: Local CIP budget, STEAP grants
Timeframe: 2014-2019.

1.3 Consider relocation of public works facility out of flood hazard area. Because this is expected to be a long term, multi-year project, for the 2014-2019 Plan period, the action to be taken is to develop a scope of work for this project.
Lead: Public Works, Administration
Priority: Medium
Status: New Initiative. This project depends on property availability. Current town owned sites are inappropriate.
Potential Funding Sources: Local bond funds
Timeframe: 2014-2019

GOAL: MINIMIZE DAMAGE CAUSED BY HIGH WINDS

Objective 1:
Improve preventive tree maintenance in local right-of-way and on town properties.

Strategic Actions:

1.1 Conduct a tree inventory.
This is expected to be a long term multi-year project.
Lead: Public Works, Administration
Priority: Medium/Low
Status: 50% completed. Remaining work is in remote open space parcels and is lower priority.
Potential Funding Sources: Operating budget using local DPW and GIS staff
Timeframe: 2014-2019.

1.2 Formulate maintenance plan based on inventory and integrate it into Public Works operating budget.

Lead: Public Works, Administration
Priority: Medium
Status: Facility database completed, using for roof and fleet maintenance. Maintenance plan is currently in use and updated annually. Need to develop reports for future forecasting.
Potential Funding Sources: Local CIP and operating budget
Timeframe: 2014-2019

Objective 2:
Minimize power outages and related impacts.

Strategic Actions:

2.1 Determine areas in Town with frequent outages.

Lead: Engineering, Administration
Priority: Medium
Status: Town Manager and EMD working with CL&P for enhanced tree trimming. Underway for past 2 years; 3 more to go.
Potential Funding Sources: Private CL&P funds
Timeframe: Completion estimated by 2017/18.

2.2 Work with Connecticut Light & Power for aggressive tree pruning program

Lead: Engineering, Administration, CL&P
Priority: Medium
Status: New Initiative. Town Manager and EMD working with CL&P for enhanced tree trimming. Underway for past 2 years; 3 more to go.
Potential Funding Sources: Private CL&P funds
Timeframe: Completion estimated by 2017/18.

2.3 Work with Connecticut Light & Power to relocate distribution underground in repetitive outage areas, or harden facilities remaining overhead. This is expected to be a long term multi-year project.

Lead: Engineering, Administration
Priority: Medium
Status: In the 2008 Plan, this effort focused on relocating transformers underground. It is recommended that the scope of this mitigation activity be broadened.
Potential Funding Sources: Private CL&P funds, STEAP
Timeframe: 2014-2019

2.4 Consider full time emergency power generators at all MDC sewage pump stations.

Lead: Engineering, MDC
Priority: Medium
Status: New Initiative. Several stations underway; remainder have been outfitted with plugs for portable generators.

Potential Funding Sources: MDC CIP funds
Timeframe: Completion estimated by 2017/18.

2.5 Consider full time emergency power generators at fuel tank distribution terminals. This is expected to be a long term multi-year project.
Lead: Engineering, Private vendors
Priority: Medium
Status: New Initiative
Potential Funding Sources: Town (for outreach to businesses), private fuel company resources (for generator purchase and installation)
Timeframe: 2014-2019.

2.6 Consider full time emergency power generators at all private cell service providers and at all shelters and back up shelters.
Lead: Engineering, Administration
Priority: Medium
Status: New Initiative. Certain vendors (Verizon) have generators at all sites. Others may be mandated due to new DEMHS regulations.
Potential Funding Sources: Cell service providers; Capital Improvements Program (General Fund or grant funding as available)
Timeframe: Completion estimated by 2017/18.

GOAL: REDUCE LOSS OF LIFE, PROPERTY DAMAGE AND ECONOMIC CONSEQUENCES AS A RESULT OF FLOODING

Objective 1:
Implement remaining recommended measures from 1995 town-wide watershed management study and other priority drainage and infrastructure projects.

Strategic Actions:

1.1 Pursue opportunities to implement further dredging and drainage projects through the capital improvement program and any other available funding sources.
Lead: Engineering, Administration
Priority: Medium
Status: A number of flood study, culvert replacements, drainage and dredging projects and other structural projects have been identified in the Town's Five –year Capital Improvements Program.
Potential Funding Sources: General Funds, bonding, grant funds as available
Timeframe: Fiscal years 2013/2014 – 2017/2018

1.2 Improve natural and artificial drainage areas that affect road flooding.
Lead: Engineering, Administration
Priority: Medium

Status: A number of culvert replacements, drainage and dredging projects and other structural projects have been identified in the Town's Five –year Capital Improvements Program.
Potential Funding Sources: General Funds, bonding, grant funds as available
Timeframe: Fiscal years 2013/2014 – 2017/2018

1.3 Investigate making improvements to channel and underground conduit of Folly Brook with Army Corps of Engineers. Because this is expected to be a long term, multi-year project, for the 2014-2019 Plan period, the action to be taken is to develop a scope of work for the project.
Lead: Engineering, Administration
Priority: Medium
Status: Efforts were initiated; however the project has not been completed. It is recommended that this project be retained in the Plan Update and a more specific schedule for implementation be established.
Potential Funding Sources: Federal Army Corps of Engineers
Timeframe: 2014-2019.

1.4 Develop plan for relocating public works equipment in the event of flooding of Town Garage. Because this is expected to be a long term, multi-year project, for the 2014-2019 Plan period, the action to be taken is to develop a scope of work for the project.
Lead: Public Works
Priority: Medium
Status: Efforts were initiated; however the project has not been completed. It is recommended that this project be retained in the Plan Update and a more specific schedule for implementation be established.
Potential Funding Sources: Local operating budget
Timeframe: 2014-2019.

Objective 2:
Ensure safety of residents and businesses in all areas of Wethersfield during flood events.

Strategic Actions:

2.1 Educate residents on new flood zone maps via website, public access portals.
Lead: Engineering, Administration
Priority: Medium
Status: Efforts were initiated and will be expanded to include outreach through the Town's website and other means of digital public access.
Potential Funding Sources: Annual Operating Budget- General Fund
Timeframe: 2014-2019

2.2 Explore participation in FEMA's Community Rating System program to reduce flood insurance premiums for residents.
Lead: Planning, Engineering, Administration
Priority: Medium

Status: Efforts were initiated and consideration of the CRS will continue. It is recommended that this project be retained in the Plan Update. The new Biggert Waters Act will increase focus on town initiated projects to reduce flood insurance premiums.
Potential Funding Sources: Annual Operating Budget- General Fund
Timeframe: 2014-2018.

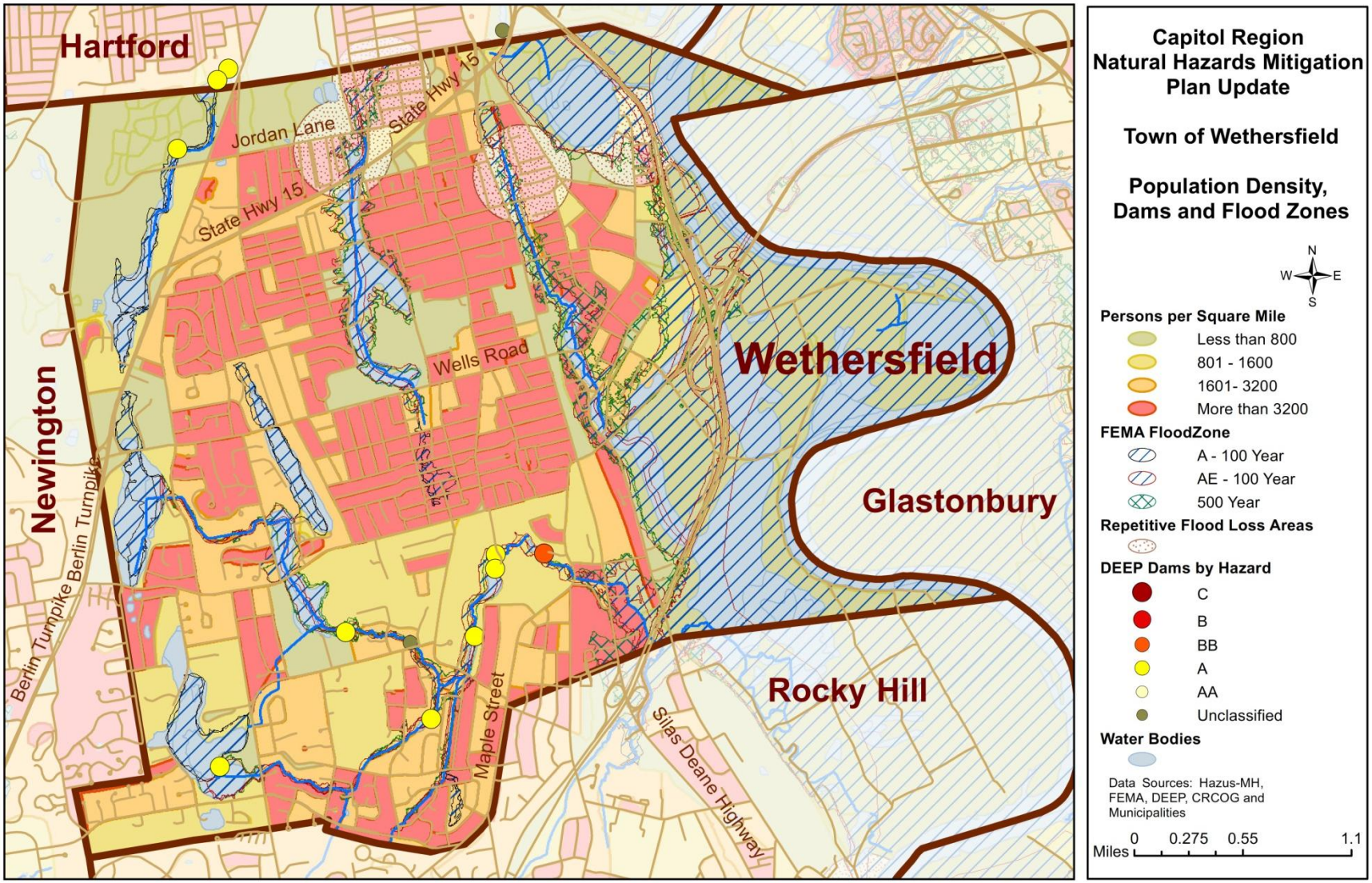
2.3 Ensure that any future development within town Agricultural (AG) zone will not increase the risk of flooding and is built to withstand flooding.
Lead: Planning, Engineering, Building
Priority: Medium
Status: In the 2008 Plan, this strategy proposed to ensure development in the Interchange Zone/Elm Street area would not increase risk of flooding. This area is now within the Agricultural Zone. Much of the Agricultural Zone is coterminous with the floodplain and subject to the Town's Floodplain Regulations. Any development activity here requires approval from the Inland Wetlands Agency. Proposed developments are reviewed as they are submitted.
Potential Funding Sources: Annual Operating Budget
Timeframe: 2014-2019

2.4 Actively participate in and monitor planning and implementation of MDC's Clean Water Project.
Lead: Engineering, Administration, MDC
Priority: Medium
Status: Projects are ongoing over next 5 years. The Clean Water Project is a fifteen-year effort scheduled to be completed in 2021.
Potential Funding Sources: Annual Operating Budget- General Fund
Timeframe: 2014-2019

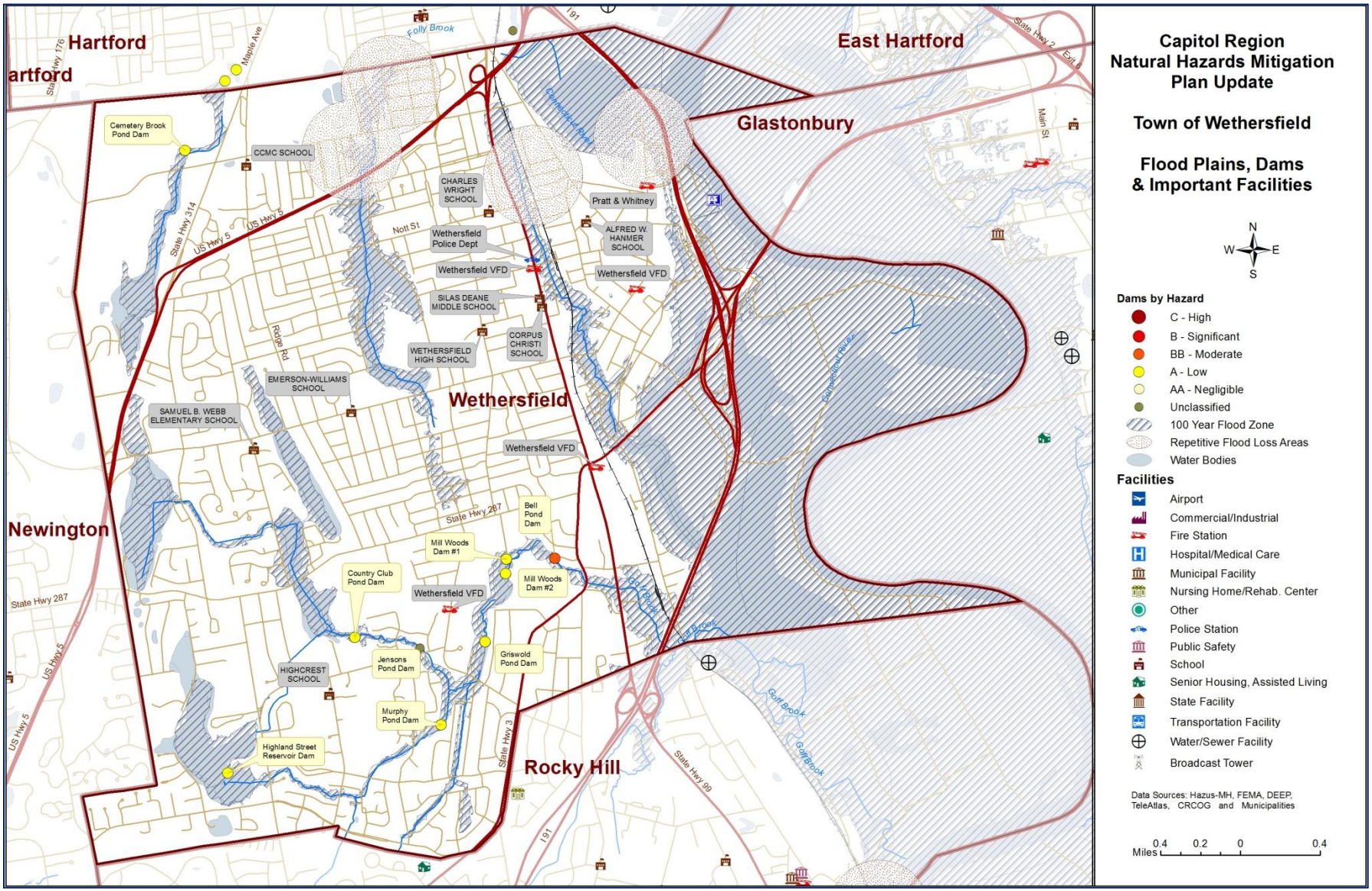
2.5 Evaluate impact of flooding on Historic District significant buildings and provide protective measures.
Lead: Engineering, Historic District Commission (HDC), Administration, Planning
Priority: Medium
Status: New Initiative
Potential Funding Sources: Small Cities grants, Historic preservation grants
Timeframe: Develop priority list based on GIS over next 2 years (2014-2016)

2.6 Investigate and train with City Hartford on operation of levee flood gates.
Lead: Public Works, Administration
Priority: Medium
Status: New Initiative. Town to participate in City exercise of the flood gates annually.
Potential Funding Sources: Annual Operating Budget- General Fund
Timeframe: 2014-2019: Annual exercise

Map 64: Wethersfield Population Density, Dams and Flood Zones



Map 65: Wethersfield Flood Plains, Repetitive Loss Areas, Dams and Important Facilities



Windsor

Windsor is a suburban community just north of Hartford. It has a land area of 31 square miles and an estimated population of about 29,044. Windsor's elevation ranges from about 32 feet on the eastern side to about 200 feet in the western edge. Its land area drains to two regional basins: the main stem of the Connecticut River Watershed and the Farmington River Watershed in the southeast area. The Town also encompasses several sub-regional drainage basins. The Connecticut River flows the length of the eastern town boundary. The Farmington River runs from west to east and joins the Connecticut River in Windsor. Other watercourses that run through town include Deckers, Meadow, Mill, Phelps, and Rainbow Brooks. Interstates 91 and 291 run through and intersect in Windsor. In addition, the highway connector between Interstate 91 and Bradley International Airport (Route 20) runs along the northern boundary of Windsor. An active railroad parallels Route 91, running north-south through Windsor. Other major transportation routes through town include state routes 75, 159, 178, 187, 218 and 305. Power generation, aerospace, insurance, computer aided design and manufacturing software development, medical technology, financial services, manufacturing of computer components, electronics, machine tools, adhesives, measuring devices, automotive parts, air movement equipment, and shade grown tobacco are the principal industries in Windsor.

Windsor is a growing center of employment within the region, and as such, experiences an increase in daytime population. According to the Connecticut Department of Labor, the average annual employment for 2010 was 23,809 jobs. There is a particular concentration of employment in the Day Hill Road area. This area is also planned to grow as an employment and residential center as the mixed-use Great Pond Village is developed. Great Pond Village proposes to add approximately 4,000 residential units, 85,000 square feet of retail space, and 820,000 square feet of commercial office and hospitality space. This additional population and areas with concentrated employment must be factored into disaster planning.

Challenges

Challenges the community faces regarding responding to natural disasters include areas within town that may become inaccessible due to flooding, the need for emergency generators at locations that provide life safety services to parts of the community, and the difficulty of retrieving real time data regarding the status of upstream dams to anticipate flooding impacts.

The National Flood Insurance Program (NFIP) has paid out 25 claims in Windsor totaling $90,399.44 to-date. Repetitive losses are also a challenge for the town. Two properties adjacent to Meadow Brook in the southern end of town have been identified as repetitive loss structures. The NFIP has paid out $31,638.42 in claims on these properties. Improvements were made in both 2007 and 2011 to address this area. In 2007, the town replaced the culvert beneath the roadway, which improved the hydraulic capacity of the brook in the area. Additionally, in 2011, slope stabilization work on the upstream banks of the channel was completed to reduce the potential for erosion that could impact the hydraulic capacity of the channel, and help maintain long term functionality of the improvements completed in 2007. Since the adoption of the 2008 Plan, there have been no changes in land use or housing development in the special flood hazard area or that would affect the Town's vulnerability to natural hazards.

A significant flood event could result in much damage. CRCOG used FEMA's Hazus-MH model to analyze the risks that the community might face from flooding. The model estimates that economic losses to the town including residential and commercial damage and business interruptions due to a flood having a 1% chance of occurring any given year (the 100-year flood) would be over $132 million. The impacts of such a flood are summarized below:

Estimated Damages from 100-Year Flood	Households Displaced	614
	People Needing Shelter	1,575
	Buildings at Least Moderately Damaged	292
	Total Estimated Economic Losses	$132,710,000
	Total Residential Building & Content Losses	$89,300,000
	Total Commercial, Industrial & Other Building & Content Losses	$43,170,000
	Total Business Interruption Losses	$240,000

CRCOG also used FEMA's Hazus-MH model to analyze the risks that the Town of Windsor might face from a hurricane as powerful as the 1938 hurricane. The model estimates that economic losses to the town including residential and commercial damage and business interruptions due to such a Category 3 hurricane would be over $135 million. The impacts of such a storm are summarized below:

Estimated Damages from a 1938 Strength Hurricane	Households Displaced	40
	People Needing Shelter	7
	Buildings at Least Moderately Damaged	978
	Buildings Completely Damaged	59
	Total Estimated Economic Losses	$135,530,000
	Total Residential Building Losses	$97,120,000
	Total Commercial, Industrial & Other Building Losses	$23,750,000
	Total Business Interruption Losses	$14,660,000
	Total Debris Generated	44,721 tons
	Truckloads (at 25 tons/truck) of building debris	492

According to information from the Connecticut Department of Emergency Management and Homeland Security, the three federally declared natural disasters of 2011 resulted in total expenses to the municipality and other local agencies of over $1.2 million. These expenses include debris and snow removal, emergency protective measures and repairs to damaged infrastructure and buildings but do not include damages experienced by private citizens and businesses.

2011 Disasters Damage Amounts Eligible for 75% Reimbursement Under FEMA Public Assistance Program				
Applicant: Municipality and Other Agencies (i.e., Fire Districts, Schools, and Private Non-Profit Agencies)	**100% of Amount Eligible for 75% Reimbursement**			**Total Damages Eligible for Public Assistance Due to 2011 Disasters**
	DR-1958-CT 2011 Snow	**DR-4023-CT Irene August 2011**	**DR-4046-CT Severe Weather Oct 2011 (Alfred)**	
Town of Windsor	$113,320.96	$38,998.75	$1,070,737.94	$1,223,057.65
Windsor Other	$12,961.60		$14,219.63	$27,181.23
Windsor Total	**$126,282.56**	**$38,998.75**	**$1,084,957.57**	**$1,250,238.88**

Goals, Objectives and Strategies

GOAL: REDUCE THE IMPACT OF FLOODING ON PROPERTY, TRANSPORTATION AND TOWN INFRASTRUCTURE

Objective 1:
Review and analyze (Mill, Meadow and Deckers Brooks) watersheds.

Strategic Actions:

1.1 Map flooding extents from 1984, 2003 and 2005 incidents.
Lead: Planning
Priority: Medium
Status: Deferred: No Activity
Potential Funding Source: General Fund
Timeframe: 2014-2019

1.2 Prioritize watersheds based on historic negative impact.
Lead: Planning, Public Works, Engineering
Priority: Medium
Status: Deferred: No Activity
Potential Funding Source: General Fund
Timeframe: 2014-2019

1.3 Implement identified improvements.
Lead: Engineering, Public Works, Planning
Priority: Medium
Status: Ongoing
Update: Improvements to Meadow Brook were completed in 2007 and 2011. An engineering evaluation of Decker's Brook was completed in 2010. The report included both recommended maintenance and structural improvements. These activities are scheduled to begin in 2013. Watershed analyses of the Mill Brook and Meadow Brook have also been identified as projects in the town's 6-year Capital Improvement Program.
Potential Funding Source: municipal bonds
Timeframe: 2014-2019

Objective 2:
Ensure emergency service accessibility through transportation infrastructure improvements.

Strategic Actions:
2.1 Develop and implement maintenance plan for River Street retaining wall.
Lead: Engineering, Public Works
Priority: Medium

Status: Upcoming
Update: The reconstruction of River Street has been scheduled for design in the town's currently adopted Capital Improvement Program for FY2018. The structural integrity of the retaining wall will be evaluated at that time to develop a maintenance program.
Potential Funding Source: General Fund and municipal bonds
Timeframe: 2018-2019

2.2 Identify, prioritize and implement local road improvements.
Lead: Public Works
Priority: Medium
Status: Deferred: No Activity
Potential Funding Source: General Fund, State and Federal aid, municipal bonds
Timeframe: 2014-2019.

2.3 Pursue improvements of state roads with the CT Department of Transportation.
Lead: Administration, Public Works
Priority: Medium
Status: Deferred: No Activity
Potential Funding Source: State and Federal funding
Timeframe: 2014-2019

Objective 3:
Reduce flooding impacts through infrastructure enhancements.

Strategic Actions:

3.1 Increase stormwater retention capacity.
Lead: Engineering, Public Works
Priority: Medium
Status: Improvements to the town's drainage system are made on a yearly basis. Detention basins are cleaned to remove deposited silt and restore capacity. New development and redevelopment is required to review stormwater management and design facilities such that there is no increase in runoff as a result of the development. Potential municipal projects are evaluated annually during the budget review process; private development is evaluated during the development review process.
Potential Funding Source: General Fund
Timeframe: 2014-2019

3.2 Develop and implement maintenance plan for stormwater facilities.
Lead: Engineering, Public Works
Priority: Medium
Status: An inventory of town-owned facilities has been completed and is updated on annual basis. Maintenance on town-owned facilities is regularly scheduled with additional maintenance performed on an as-needed basis. Additionally, in

2009, the town adopted an ordinance that requires private developments to record an "Inspection & Maintenance Agreement" on land records, which outlines regular maintenance of the on-site stormwater facilities to ensure long term functionality and reduce risks of downstream flooding. Potential municipal projects are evaluated annually; private development is subject to schedules required as a result of the development approval process.

Potential Funding Source: General Fund
Timeframe: 2014-2019

3.3 Support Metropolitan District Commission efforts to prevent flood water infiltration of sewer system.

Lead: Public Works, Administration
Priority: Medium
Status: Underway: The Town will continue to work with the MDC on addressing infiltration issues throughout the town.
Potential Funding Source: MDC, State and Federal aid
Timeframe: 2014-2019

3.4 Conduct public information campaign on property maintenance with respect to flooding, wind, freezing and other hazards.

Lead: Emergency Management, Administration
Priority: Medium
Status: Although no concerted public information campaign was conducted, the Emergency Management, Public Works and Building & Fire Safety Departments maintain advice for residents on their web pages.
Potential Funding Source: General Fund
Timeframe: Annual or more frequent updates are anticipated during 2014-2019

Objective 4:
Ensure adequate flood insurance coverage for residents.

Strategic Actions:

4.1 Pursue Community Rating System designation from FEMA.

Lead: Planning, Administration, Emergency Management
Priority: Medium
Status: Deferred: No activity
Potential Funding Source: General Fund
Timeframe: 2014-2019

GOAL: REDUCE THE IMPACT OF WINTER STORMS AND HIGH WIND EVENTS ON POWER DISRUPTION, EMERGENCY ACCESS, AND BUSINESS DISRUPTION

Objective 1:
Ensure adequate and timely removal of snow and ice from transportation network.

Strategic Actions:

1.1 Evaluate alternative technologies for snow and ice removal.
Lead: Public Works
Priority: High
Status: Ongoing
Update: The Public Works department reviews on a yearly basis the methods and materials used for snow and ice removal.
Potential Funding Source: General Fund
Timeframe: 2014-2019 - annual review

1.2 Review and install roadway management system to determine optimal time for liquid ice control application.
Lead: Public Works
Priority: Medium
Status: Deferred: No activity
Potential Funding Source: General Fund, State and Federal aid
Timeframe: 2014-2019

Objective 2:
Enhance capacity of emergency response.

Strategic Actions:

2.1 Increase sheltering capacity.
Lead: Emergency Management, Administration
Priority: Medium
Status: Ongoing
Update: A team has been created to finalize a document for the use of shelters in Windsor. As part of this team's efforts they are in the process of identifying additional facilities for use as both day and overnight sheltering.
Potential Funding Source: General Fund
Timeframe: 2014-2019.

2.2 Work with local hotels to ensure adequate emergency generating equipment to reduce reliance on municipal emergency shelters.
Lead: Emergency Management, Building
Priority: Medium

Status: Deferred: No activity
Potential Funding Source: General Fund
Timeframe: 2014-2019

2.3 Increase training for hazard response, e.g. National Incident Management System (NIMS).
Lead: Emergency Management, Police, Fire
Priority: Medium
Status: Deferred: No activity
Potential Funding Source: General Fund, State and Federal aid
Timeframe: 2014-2019

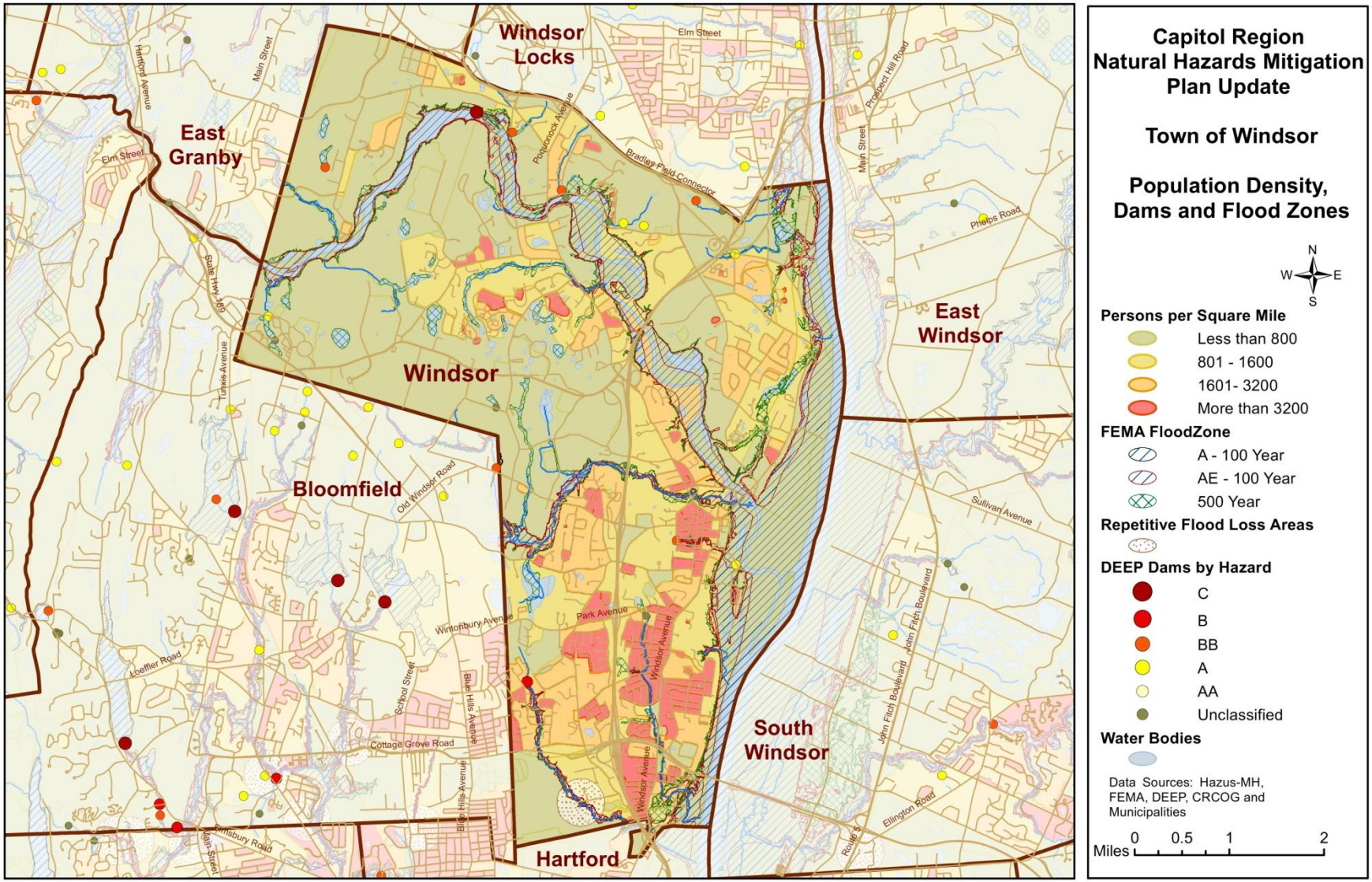
2.4 Consider and develop a secondary Emergency Operations Center.
Lead: Emergency Management, Police, Fire
Priority: Medium
Status: Deferred: No activity
Potential Funding Source: General fund, State and Federal aid
Timeframe: 2014-2019.

Objective 3:
Minimize access disruptions at public safety buildings.

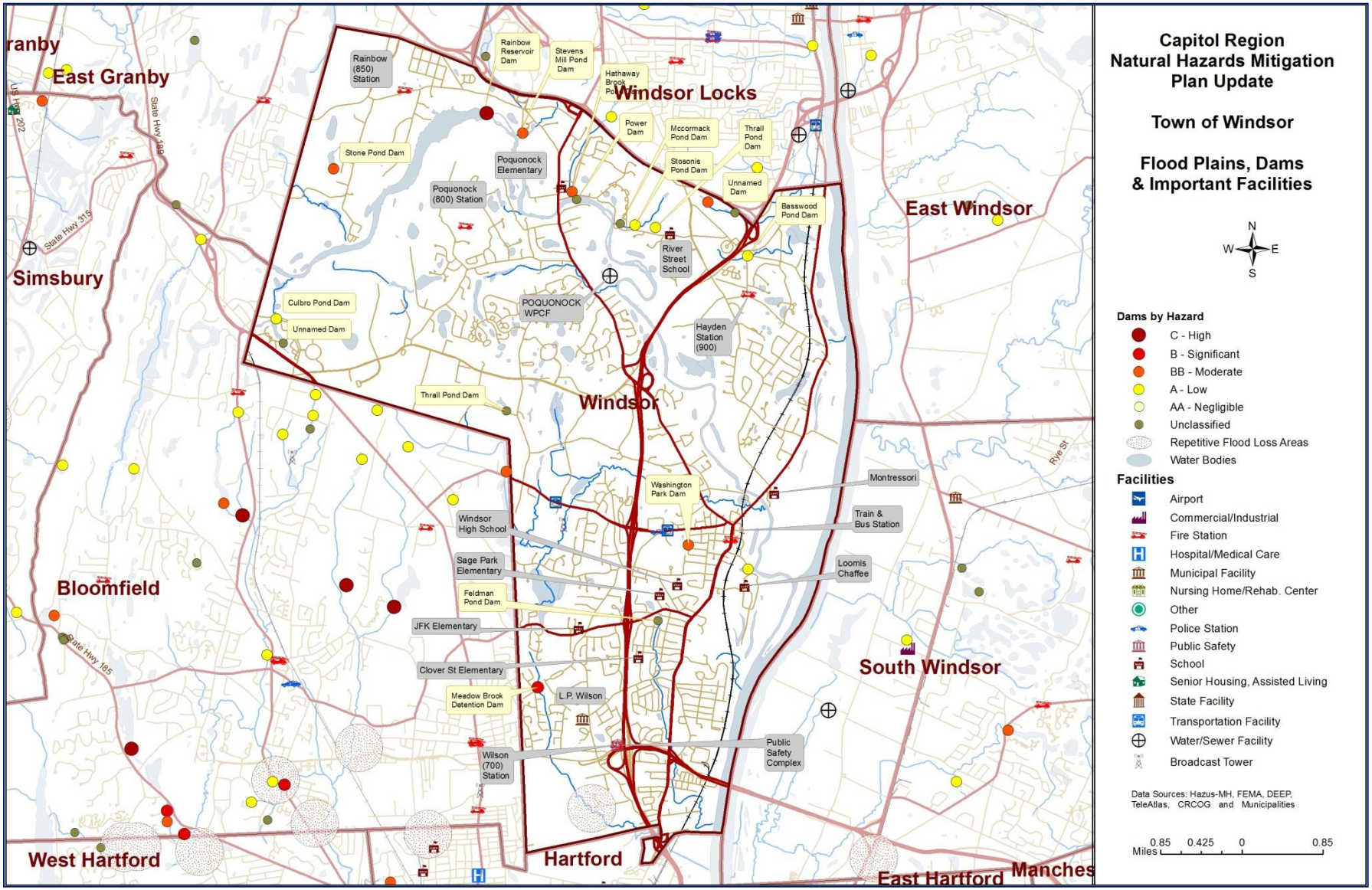
Strategic Actions:

3.1 Bury power lines at public safety buildings.
Lead: Emergency Management, Administration
Priority: Medium
Status: Deferred: No activity
Potential Funding Source: State and Federal aid
Timeframe: 2014-2019

Map 66: Windsor Population Density, Dams and Flood Zones



Map 67: Windsor Flood Plains, Repetitive Loss Areas, Dams and Important Facilities



Windsor Locks

Windsor Locks is a fully suburban community in northern Hartford County. The town encompasses only nine square miles, but has a population of approximately 12,400. The land area of Windsor Locks ranges from about 75 to 150 feet above sea level and contributes to three watersheds: primarily the main stem of the Connecticut River Watershed, but also the Stony Brook Watershed in the northwest and the Farmington River Watershed in the southwest. The Connecticut River forms the eastern town boundary. Other watercourses include Adds, Dibble Hollow, Kettle and Waterworks Brooks. Principal industries include food servicing and distribution, manufacture of aerospace products, paper products, electronics and machines. Major transportation routes through Windsor Locks include Interstate 91 and state routes 75, 140 and 159. In addition, highway 20, the connector between Interstate 91 and Bradley International Airport forms the southern town boundary. The majority of Bradley International Airport, the second largest commercial airport in New England, is located within Windsor Locks, as well as significant numbers of hotels and related travel services.

Challenges

Windsor Locks is vulnerable to loss of life and property and the economic consequences that result from flooding, high winds, severe winter storms and other natural hazards. Localized flooding and downed trees resulting in impassable roads continue to be a major worry for emergency response staff in terms of their ability to reach people in need.

The National Flood Insurance Program has paid nine property damage claims in Windsor Locks totaling $166,872 to-date. Windsor Locks has no Repetitive Loss Property claims to-date. Several existing commercial and industrial buildings are located in identified hazard areas. The Montgomery Mill (Dexter Mill) and Ahlstrom are properties upon which contaminants have been recorded. These are located on the Connecticut River and so are considered vulnerable. One vacant building on Main Street was recently replaced with a new building after a revision to the flood map was approved and compensatory storage was provided. No other construction has been permitted in flood prone areas since 2008.

The Town has recently commissioned various efforts for the planning and revitalization of Main Street, including; relocating the existing train station from the southern part of town to a downtown location, traffic mitigation, reuse of the Montgomery Mill and other efforts. Opportunities for mitigation will be considered as planning efforts continue. The Town is also working with property owners along the Connecticut River to encourage open space preservation, community gardens and other creative low impact uses on their lands.

Water Pollution Control staff are concerned with access to and shut down of three locations: Dexter Pump Station, South Main Street Pump Station and the Water Pollution Control Facility. An estimate of potential dollar losses to such structures would be $750,000 to $1.5 million for the Dexter Pump Station's contents and $175,000 to $250,000 for South Main Street Pump Station's contents.

Although flooding is not as large a concern here as in some other communities, a significant flood event could result in much damage particularly to commercial and industrial properties. CRCOG used FEMA's Hazus-MH model to analyze the risks that the Town of Windsor Locks might face from a major flood. The model estimates that economic losses to the town including residential and commercial damage and business interruptions due to a flood having a 1% chance of occurring any given year (the 100-year flood) would be over $2 million. The impacts of such a flood are summarized below:

Estimated Damages from 100-Year Flood	Households Displaced	9
	People Needing Shelter	10
	Buildings at Least Moderately Damaged	0
	Total Estimated Economic Losses	$2,420,000
	Total Residential Building & Content Losses	$630,000
	Total Commercial, Industrial & Other Building & Content Losses	$1,780,000
	Total Business Interruption Losses	$10,000

CRCOG also used FEMA's Hazus-MH model to analyze the risks that the Town of Windsor Locks might face from a hurricane as powerful as the 1938 hurricane. The model estimates that economic losses to the town including residential and commercial damage and business interruptions due to such a Category 3 hurricane would be over $54 million. The impacts of such a storm are summarized below:

Estimated Damages from a 1938 Strength Hurricane	Households Displaced	13
	People Needing Shelter	1
	Buildings at Least Moderately Damaged	479
	Buildings Completely Damaged	27
	Total Estimated Economic Losses	$54,270,000
	Total Residential Building Losses	$35,760,000
	Total Commercial, Industrial & Other Building & Content Losses	$11,300,000
	Total Business Interruption Losses	$7,210,000
	Total Debris Generated	14,968 tons
	Truckloads (at 25 tons/truck) of building debris	227

According to information from the Connecticut Department of Emergency Management and Homeland Security, the three federally declared natural disasters of 2011 resulted in total expenses to the municipality of over $1.6 million with the majority of these expenses resulting from Storm Alfred. These expenses include debris and snow removal, emergency protective measures and repairs to damaged infrastructure and buildings but do not include damages experienced by private citizens and businesses.

2011 Disasters Damage Amounts Eligible for 75% Reimbursement Under FEMA Public Assistance Program				
	100% of Amount Eligible for 75% Reimbursement			
Applicant: Town	**DR-1958-CT 2011 Snow**	**DR-4023-CT Irene August 2011**	**DR-4046-CT Severe Weather Oct 2011 Alfred**	**Total Damages Eligible for Public Assistance Due to 2011 Disasters**
Town of Windsor Locks	**$58,133.89**	**$21,047.07**	**$1,583,630.87**	**$1,662,811.83**

Goals, Objectives and Strategies

GOAL: REDUCE THE LOSS OF LIFE AND PROPERTY AND THE ECONOMIC CONSEQUENCES THAT RESULT FROM FLOODING, HIGH WINDS, SEVERE WINTER STORMS AND OTHER NATURAL DISASTERS. REDUCE LOSS OF ACCESS AND POWER TO SIGNIFICANT BUILDINGS SUCH AS WATER POLLUTION CONTROL FACILITY, DEXTER PUMP STATION, SOUTH MAIN PUMP STATION, SCHOOLS, SENIOR CENTER, REHAB CENTER, TOWN BUILDINGS USE FOR EMERGENCY PURPOSES. INCREASE RESIDENT AND BUSINESS EMPLOYEE KNOWLEDGE OF WARNING SYSTEMS.

Objective 1:
Reduce future flooding by improving, modifying and/or replacing existing man-made and natural drainage systems.

Strategic Actions:

1.1 Address drainage issues on Papermill Brook at Center Street/ Whitton Street.
Lead: Public Works, Administration
Status: Completed, Mitigated, Replaced

1.2 Address drainage issues at Chestnut and Main Streets.
Lead: Public Works, Administration
Current Status: Mitigated, cleaned/installed trash rack

1.3 Address drainage issues on Kettle Brook at Middle School on Center Street.
Lead: Public Works, Administration
Priority: Medium
Status: Cleaned out as needed, partially mitigated; created scour hole for wash out. Future cleanouts will be undertaken on an as needed basis
Potential Funding Sources: General operating funds
Timeframe: 2014-2019

1.4 Address drainage issues on Industrial Road.
Lead: Public Works, Administration
Priority: Medium
Status: Not yet initiated; deferred due to lack of funding. Drainage improvements will be considered for inclusion in the capital improvements program during annual budget preparations and will be undertaken when funding is available.
Potential Funding Sources: General operating funds, capital improvements program funding, grants
Timeframe: 2014-2019

1.5 Address drainage issues at West and Spring Streets.
Lead: Public Works, Administration
Priority: Medium
Status: Not yet initiated; deferred due to lack of funding. Drainage improvements will be considered for inclusion in the capital improvements program during annual budget preparations and will be undertaken when funding is available.
Potential Funding Sources: General operating funds, capital improvements program funding, grants
Timeframe: 2014-2019

1.6 Address drainage issues in the Smally Road area.
Lead: Public Works, Administration
Priority: Medium

Status: Not yet initiated; deferred due to lack of funding. Drainage improvements will be considered for inclusion in the capital improvements program during annual budget preparations and will be undertaken when funding is available.
Potential Funding Sources: General operating funds, capital improvements program funding, grants
Timeframe: 2014-2019

1.7 Address drainage issues on Bristol Road.
Lead: Public Works, Administration
Priority: Medium
Status: Not yet initiated; deferred due to lack of funding. Drainage improvements will be considered for inclusion in the capital improvements program during annual budget preparations and will be undertaken when funding is available.
Potential Funding Sources: General operating funds, capital improvements program funding, grants
Timeframe: 2014-2019

1.8 Address drainage issues at Dibble Hollow and Bel Air Circle.
Lead: Public Works, Administration
Priority: Medium
Status: Not yet initiated; deferred due to lack of funding. Drainage improvements will be considered for inclusion in the capital improvements program during annual budget preparations and will be undertaken when funding is available.
Potential Funding Sources: General operating funds, capital improvements program funding, grants
Timeframe: 2014-2019

1.9 Address drainage issues at Gaylord and Lowndes Drive.
Lead: Public Works, Administration
Priority: Medium
Status: Not yet initiated; deferred due to lack of funding. Drainage improvements will be considered for inclusion in the capital improvements program during annual budget preparations and will be undertaken when funding is available.
Potential Funding Sources: General operating funds, capital improvements program funding, grants
Timeframe: 2014-2019

Objective 2:
Educate the property owners and business owners about updated horns and public address system, Everbridge alerts and tones.

Strategic Actions:

1.1 Work with school system to reach out to students/families to educate public.
Lead: Emergency Management Director
Priority: Medium

Status: This is an ongoing effort; but a new initiative for this plan update. A brochure was produced and distributed to the school children.
Potential Funding Sources: General operating funds
Timeframe: 2014-2019: Annually during the school year

1.2 Use local advertising opportunities to educate public.
Lead: Emergency Management Director
Priority: Medium
Status: This is an ongoing effort; but a new initiative for this plan update. Outreach will be conducted periodically and prior to anticipated major storm events throughout the plan period
Potential Funding Sources: General operating funds
Timeframe: 2014-2019

Objective 3:
Ensure that new development will not increase flooding threats to existing properties.

Strategic Actions:

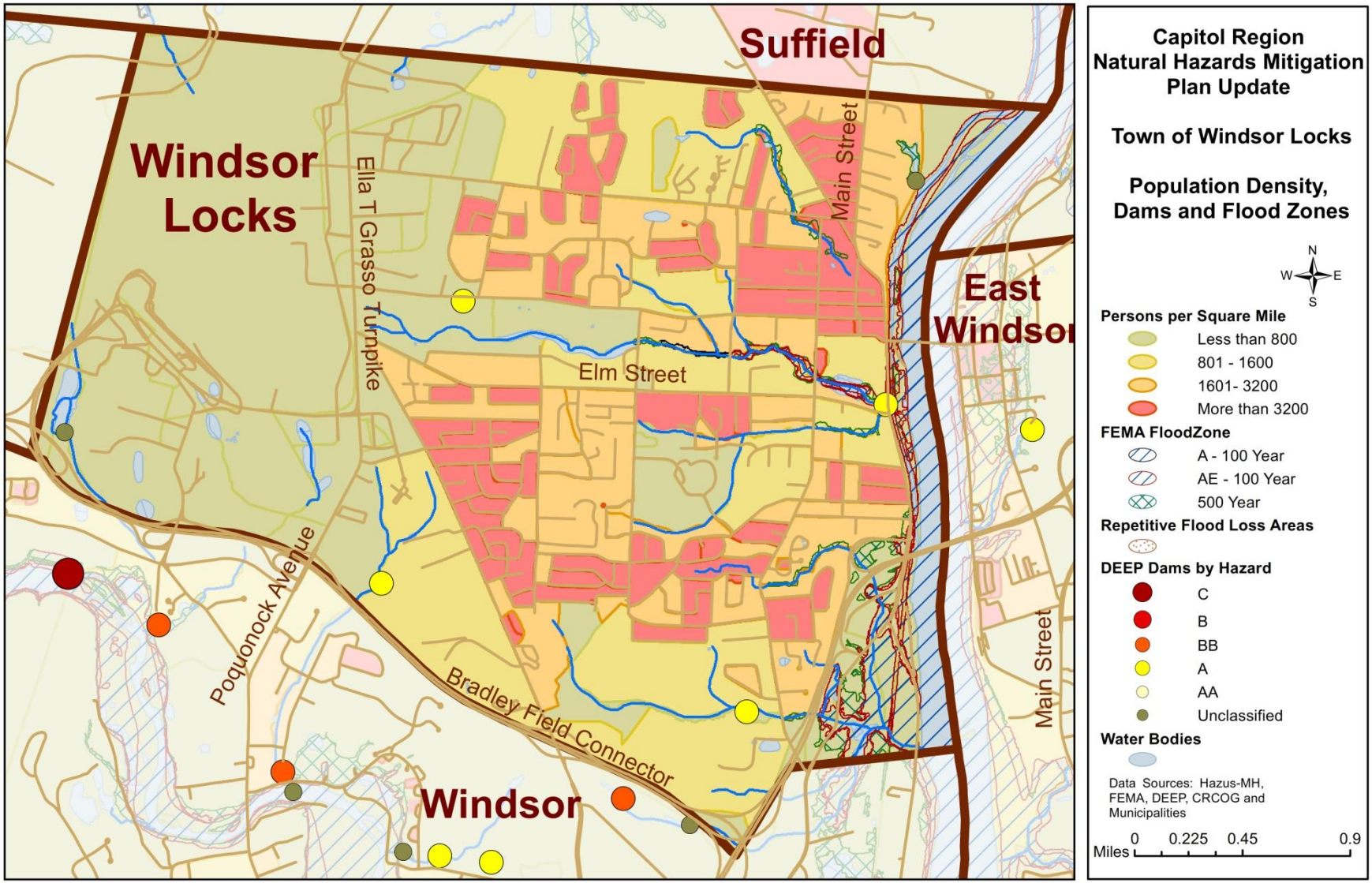
3.1 Review, amend as necessary, and enforce land use regulations.
Lead: Zoning Officer, Planning & Zoning
Priority: Medium
Status: In 2008, Windsor Locks amended its flood zone regulations to maintain eligibility with the National Flood Insurance Program. Enforcement of regulations is an established practice and will continue.
Potential Funding Sources: General operating funds
Timeframe: 2014-2019

Objective 4:
Ensure continuity of public services during power outages.

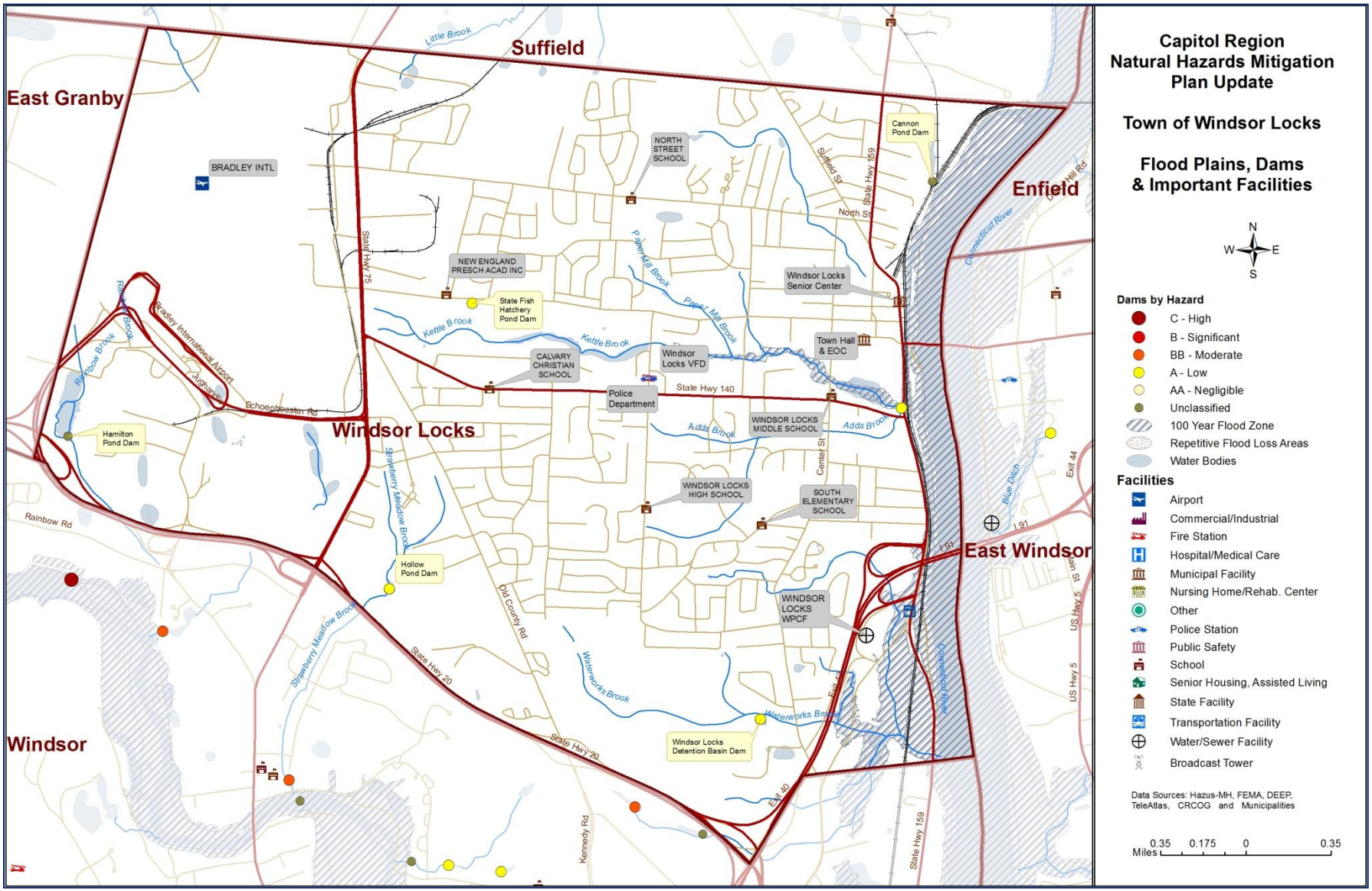
Strategic Action:

1.1 Provide generators for critical town facilities.
Lead: Emergency Management, Public Works, Administration
Priority: Medium
Status: This is a new initiative.
Potential Funding Sources: Capital improvements program funding, grants
Timeframe: To be initiated in 2014. Completion is anticipated by 2019.

Map 68: Windsor Locks Population Density, Dams and Flood Zones



Map 69: Windsor Locks Flood Plains, Repetitive Loss Areas, Dams and Important Facilities



Section V: Planning Process

Planning Process

The update planning process began in early 2012 when the Federal Emergency Management Agency (FEMA) awarded the Capitol Region Council of Governments (CRCOG) a Pre-Disaster Mitigation Planning Grant to update its regional natural hazard mitigation plan. This Plan Update was developed in collaboration with the Capitol Region Emergency Planning Commission (CREPC), the Region's 30 municipalities and the Department of Energy and Environmental Protection (CT DEEP). A sub-committee of CREPC, ESF-5 Emergency Management (which was expanded to reach out to additional officials from all 30 municipalities for the purposes of this update) served as the planning committee for the update process and provided guidance to the project. CRCOG staff coordinated efforts to involve officials from each town in efforts to update individual municipal sections. Finally, members of the public were provided opportunities to provide input throughout the development of the Plan Update.

Hazards Identification

In the development of the 2008 Pre-Disaster Natural Hazards Mitigation Plan, CRCOG staff proposed a list of the natural hazards to be addressed in the Plan based on the State Natural Hazard Plan; historical weather records from a variety of media sources, the United State Geological Survey, the National Weather Service and other agencies; and, from discussions with DEEP staff. The hazards were discussed with the CREPC planning sub-committee in late 2006, the Regional Planning Commission in early 2007, and officials from member municipalities in early 2007. The following hazards were agreed upon for inclusion in the Plan due to their likelihood to occur in, and/or their potential impacts, on the Region: dam failure, drought, floods, forest fires, severe winter storms, hurricanes and tornadoes/high winds. Several hazards were dismissed due to their low likelihood of occurrence or their minimal impacts on the Region, including avalanches, expansive soils, land subsidence, landslide, tsunamis, and volcanoes.

As the update to the 2008 plan was initiated, CRCOG staff researched natural hazards and major storm events impacting the Region and State in the last several years. In July 2012, the expanded CREPC ESF-5 planning committee met to reexamine the list of hazards impacting the Capitol Region. The committee agreed that the list of eight natural hazards identified in the 2008 Plan should continue to be considered the natural hazards addressed in the Plan Update. Committee members considered suggestions to include ice jams, heat waves and solar flares among hazards to be addressed; however, there was not a consensus of the whole committee to include these in the Plan Update. The committee was also asked to rate the hazards for their significance and impact on the Region. Flooding ranked as the number one hazard of concern, followed closely by hurricanes and then by winter storms and tornados. (Meeting Notes are included in the Appendix.)

Data Collection and Analysis/Risk Assessment

As in the development of the 2008 Plan, CRCOG staff collected and analyzed the hazards and loss data for participating municipalities to reduce duplication of efforts and to provide a common ground for evaluating mitigation strategies. The data came from a wide variety of sources including FEMA, DEEP, the National Weather Service, regional newspapers, the United States Geological Survey, United States

Census Bureau, municipalities and CRCOG's internal geographic information system as well as other resources. The data were used to evaluate natural disasters in terms of frequency, magnitude, areas of impact and economic loss.

The collected data were analyzed using the CRCOG's geographic information system software, specifically ESRI ArcMap 10, and HAZUS-MH. HAZUS-MH is loss estimation software developed by FEMA under contract with the National Institute of Building Sciences. This software works in conjunction with ESRI ArcMap 10 to perform complex spatial analyses necessary to estimate losses from earthquake, hurricanes and floods. While the 2008 Plan only incorporated the results from the hurricane model at the regional level because of difficulties in running the flood model, for this update, we were able to perform flood modeling at the municipal level for this update. CRCOG also ran the earthquake model at the regional level and hurricane model at the local level for the update.

Municipal and regional plans of conservation and development, municipal zoning and flood plain regulations, municipal budget and capital improvement program documents, and flood management studies were also reviewed during the course of the update.

Municipal Plans Review/Update

As the hazards analyses were undertaken, CRCOG staff also led meetings with municipal officials to initiate updates to individual city and town plans. These meetings were held in each of the thirty municipalities and included local staff from a variety of departments including administration, planning, emergency management, police, fire, public health, sanitation, public works, engineering, information technologies, social services, human resources, boards of education, ambulance services, among others. In some towns citizens and elected officials also participated. Following these municipal meetings, CRCOG staff worked with the municipally designated staff contacts to incorporate the updates prepared by the municipalities. CRCOG staff conducted the following meetings locally with municipal officials to initiate the local update process:

Andover:	April 23, 2013; 9:30 am; 1 attendee
Avon:	October 22, 2012; 9:30 am; 12 attendees
Bloomfield:	April 30, 2013; 10 am; 4 attendees
Bolton:	February 22, 2013; 9am; 6 attendees
Canton:	December 11, 2012; 9:30 am; 5 attendees
East Granby:	April 30, 2013; 1pm; 2 attendees
East Hartford:	June 18, 2012; 9:30 am; 4 attendees
East Windsor:	November 28, 2012; 1:30 pm; 10 attendees
Ellington:	November 30, 2012; 9:30 am; 4 attendees
Enfield:	December 11, 2012; 2 pm; 4 attendees
Farmington:	November 5, 2012; 11:30 am; 3 attendees
Glastonbury:	July 16, 2012; 1:30 pm; 10 attendees
Granby:	December 19, 2012; 9:30 am; 9 attendees
Hartford:	February 7, 2013; 10 am; 7 attendees
Hebron:	February 27, 2013; 9 am; 12 attendees
Manchester:	November 16, 2012; 10:30 am; 6 attendees

Marlborough: March 14, 2013; 1 pm; 9 attendees
Newington: February 28, 2013; 9 am; 4 attendees
Rocky Hill: March 15, 2013; 9:30 am; 9 attendees
Simsbury: November 19, 2012; 9:30am; 3 attendees
Somers: May 6, 2013; 9:30 am; 3 attendees
South Windsor: November 7, 2012; 1:30 pm; 12 attendees
Stafford: December 18, 2012; 9:30 am; 4 attendees
Suffield: April 25, 2013; 10 am; 3 attendees
Tolland: January 29, 2013; 9:30 am; 4 attendees
Vernon: April 26, 2013; 11 am; 12 attendees
West Hartford: January 18, 2013; 9:30 am; 7 attendees
Wethersfield: January 28, 2013; 1:30 pm; 5 attendees
Windsor: December 13, 2012; 9:30 am; 9 attendees
Windsor Locks: December 19, 2012; 1:30 pm; 8 attendees

Following the initial municipal meetings, local staff and officials worked to consider their communities' risks and vulnerabilities and update local mitigation strategies. Table 27 below summarizes the departments and functions of municipal representatives involved in the planning process in each community. Over 400 municipal officials and staff were involved in developing this plan update. These officials and staff included those representing the local administration such as town managers, financial directors, risk managers and human resources directors; elected officials such as mayors, first selectmen and selectmen; health and human services personnel such as health directors, human, social and senior services directors, as well as sanitarians; land use and development officials including planners, zoning and building officials, community and economic development directors; public safety personnel from police, fire, emergency management and ambulance services; public works personnel including engineering, highway, sanitation, water and sewer, and facilities management; other municipal staff such as GIS, IT, and parks and recreation staff; and public schools and boards of education representatives including superintendents and school facilities directors. As can be seen, the majority of towns involved officials from a range of municipal functions in the planning process and most included land use/development, public safety and public works staff in the effort.

Table 27: Municipal Representatives Involved in the Plan Update Process

Municipality	Administration	Elected Official	Health & Human Services	Land Use/ Development	Other	Public Safety	Public Works	Schools/Education
Andover		X						
Avon	X		X	X	X	X	X	
Bloomfield				X		X	X	
Bolton	X			X			X	
Canton	X			X		X	X	

Municipality	Administration	Elected Official	Health & Human Services	Land Use/ Development	Other	Public Safety	Public Works	Schools/Education
East Granby		X		X				
East Hartford	X	X				X	X	
East Windsor		X	X	X		X	X	X
Ellington		X		X		X	X	
Enfield	X	X					X	
Farmington	X			X	X	X	X	X
Glastonbury	X		X	X	X	X	X	
Granby	X			X		X	X	X
Hartford			X	X		X	X	
Hebron	X	X		X		X	X	X
Manchester	X		X	X		X	X	
Marlborough	X	X		X		X	X	
Newington				X		X	X	
Rocky Hill	X			X		X	X	
Simsbury	X	X		X		X	X	
Somers		X					X	
South Windsor	X		X		X	X	X	X
Stafford		X		X			X	X
Suffield			X	X		X	X	
Tolland	X		X	X		X	X	X
Vernon	X	X		X		X	X	
West Hartford				X		X	X	X
Wethersfield				X		X	X	
Windsor	X		X	X		X	X	
Windsor Locks		X		X		X	X	X

Strategy Analysis and Prioritization

In the development of the 2008 Plan, CRCOG and municipal staff considered a broad array of mitigation strategies to achieve regional and municipal goals. Mitigation strategies were prioritized according to a variation of the STAPLEE evaluation process recommended in FEMA's *Developing the Mitigation Plan: Identifying Mitigation Actions and Implementation Strategies* (April 2003). Each strategy was scored according to the following criteria:

	Yes	No
1. Is the action socially acceptable (compatible with community values)?		
2. Is the strategy technically feasible?		
3. Does the community have the capacity to implement and maintain the action?		
4. Is there public support to implement and maintain the action?		
5. Does the community have the legal authority to implement the strategy?		
6. Is the action cost-effective?		
7. Is the strategy consistent with environmental policies and goals?		

1-2 yes = low priority
3-4 yes = medium priority
5-6 yes = high priority

During the Plan Update process, the STAPLEE method was again presented to municipal staff as a means for the municipalities to evaluate their current and proposed mitigation strategies. STAPLEE also formed the basis for the evaluation of the benefit-cost comparison of mitigation strategies.

In the reevaluation of the regional strategies proposed in 2008 and consideration of new regional mitigation strategies to undertake in the 2014-2019 Plan Update term, CRCOG sought the advice of the CREPC planning committee at a workshop held in February 2013. The meeting was attended by fourteen municipal officials from eleven member towns as well as representatives from FEMA, CT DEMHS, the Metropolitan District Commission and officials from two neighboring communities. At this workshop, a status report on the 2008 regional mitigation goal, objectives and strategies/actions was presented. CRCOG staff presented a number of proposed revisions to current strategies and several additional strategies/actions based on our findings and discussions with local officials at the individual municipal meetings. These proposed revisions as well as proposed new strategies/actions were discussed with attendees. Attendees were then asked to reassess the priorities assigned to the 2008 strategies as well as those proposed for the new strategies. Attendees were asked to consider the following priority definitions in their assessments:

Priority Designations for Mitigation Strategies

High: Accomplishment or substantial work toward accomplishing this strategy is critical and essential to achieving the goal and objective. Successful execution of this mitigation action is expected to make a substantial contribution to the advancement of our goal. A concerted effort should be made to undertake this action. This is a "***Must Do***" action.

Medium: This mitigation strategy is clearly supportive of the goal and objective, however, it is not absolutely essential to their achievement. Successful implementation of this strategy is expected to make an incremental contribution to achieving the goal and objective. This is a "***Should Do***" action.

Low: Although important and advisable, this mitigation strategy should be undertaken as long as it does not interfere with the accomplishment of higher priority strategies. This is a "***Would Be Nice to Do***" action.

Based on input from the committee members, revisions were made to one objective and to several mitigation, strategies and priorities. An additional mitigation strategy was also proposed and accepted by the planning committee. (Meeting Notes are included in the Appendix.)

During the public comment period on the draft plan, a request was made that CRCOG assist municipalities in outreach to those with functional needs. This request was brought to the planning committee which agreed to incorporate this as a new regional mitigation strategy. A high priority was assigned to this action based on similar priorities for related municipal actions and on its benefit-cost ratio.

Municipal officials were also asked to consider the above priority designations and STAPLEE criteria in the development of municipal strategies, both in the reassessment of existing strategic actions that would be continued and in the consideration of new initiatives to be addressed.

Public Participation

A variety of means were used to inform the public of the planning process and to gain public input on hazards, areas and issues of concern, and on mitigation measures. These specific outreach efforts are described below.

Reports and Presentations to Local Officials - These included regular reports to the CRCOG Policy Board and CREPC. Also, articles describing update activities and progress were included in the CRCOG Newsletters of October 2011, June 2013, and September and October 2013. Two presentations were made on March 15, 2012 to introduce the plan update project to municipal officials. The first presentation was made at the DEMHS Region 3 Citizens Preparedness & Emergency Management Seminar which had an audience of over 100 emergency management directors and chief municipal officers. The second was made at the bimonthly meeting of the Capitol Region Regional Planning Commission which had an audience of a dozen local planning and zoning commission members.

Presentations on the draft Plan Update were also made to the Policy Board, to a subcommittee of CREPC, and to the Regional Planning Commission in September 2013. Policy Board, Regional Planning Commission, and CREPC meeting are public meetings with meeting notices, agendas, and minutes published on CRCOG's website.

Web Pages - CRCOG's web page related to the Natural Hazards Mitigation Plan was updated throughout the planning process. Translations of CRCOG's web pages are available in over seventy languages. Additional links to the Natural Hazard Mitigation Plan page were also added from other web pages on CRCOG's site. Initial drafts of the Introduction, Hazards Evaluation and Regional Mitigation Strategies sections of this Plan Update were posted to the CRCOG website in February 2013. All municipal CEOs and the planning committee were notified of their availability. Revised drafts of the Introduction and Hazards Evaluation sections were posted in June 2013. The draft for public review was posted in September 2013.

Opinion Survey - A survey was developed to solicit input from the public on local mitigation activities and strategies. The survey was posted online on the CRCOG website in March 2013 and on the Get Ready Capitol Region website in April 2013. Paper survey forms were also brought to the sub-regional public workshops. Survey answers were tabulated by the respondents' hometown and results were shared with municipal officials for consideration in updating the municipal strategies sections. In all, 147 persons responded to the survey. Most respondents resided in one of the thirty municipalities participating in the Plan Update; however eight lived outside the region. Most respondents (84%) live in single-family homes while 7% live in two or three family homes and 9% live in multifamily homes.

The survey asked participants to review a list of twenty-four mitigation measures and select the five most important measures their city or town should take, or continue to take, to prevent or lessen the impacts and damages caused by natural hazards. The table below lists the measures chosen in order of the frequency of their selection.

Table 28: Mitigation Measures by Frequency of Selection

Answer Options	Response Percent	Response Count
Use an emergency alert system to contact residents	49.3%	72
Provide back-up power to critical municipal facilities (police & fire stations, town hall, etc)	43.8%	64
Support training of municipal staff and volunteers for emergency response	43.2%	63
Encourage local gas stations, pharmacies and grocery stores to install back-up generators	41.1%	60
Encourage residents to prepare family disaster plans and supply kits	40.4%	59
Trim or remove trees which could bring down power lines	39.0%	57
Ensure that roads are passable quickly after storms	36.3%	53
Undertake a public outreach program on emergency preparedness	32.2%	47
Contact and assist the elderly and others with special needs in the event of natural disasters	31.5%	46
Encourage utilities to consider burying existing electric and cable lines	19.9%	29
Ensure electric and cable lines are installed underground in new development	17.8%	26
Encourage nursing homes, senior housing, and group homes to install back-up generators	17.1%	25
Fix drainage problems that cause flooding on roads	16.4%	24

Keep development out of flood plains and other environmentally sensitive areas	14.4%	21
Strengthen regulations to ensure development does not create drainage or ground water problems	11.0%	16
Improve local maps to better identify areas vulnerable to natural disasters	11.0%	16
Ensure that dams are routinely inspected and maintained	8.2%	12
Analyze potential snow load problems on local buildings	4.1%	6
Analyze the potential for forest and wild fires in the community	2.7%	4
Acquire and remove buildings that flood repeatedly	2.1%	3
Identify buildings and structures that might be susceptible to earthquake damage	2.1%	3
Encourage residents and businesses to purchase flood insurance	1.4%	2
Encourage residents and businesses to flood proof their buildings	0.7%	1
Enact a drought ordinance	0.0%	0

As can be seen, the strongest support among all respondents was expressed for using an emergency alert system to contact residents. In addition to the strong support shown for emergency communications, strong support was also expressed for measures which could help restore a sense of normalcy after a significant event. Over 40% of respondents expressed the need for back-up power for critical municipal facilities such as town halls, and police and fire stations, as well as for private facilities that provide important community functions such as gas stations, pharmacies, and grocery stores. Over a third of all respondents also urged municipalities to, “Ensure that roads are passable quickly after storms.”

Support was also expressed for ensuring that the public is prepared for natural disasters. Forty percent of respondents said municipalities should “Encourage residents to prepare family disaster plans and supply kits” and nearly a third wanted municipalities to “Undertake a public outreach program on emergency preparedness.” Support for preparation among those who need to respond in the event of natural disasters was also expressed among many respondents. Forty-three percent supported training of municipal staff and volunteers for emergency response.

Reduction in the potential for power outages was also heavily supported among respondents. Thirty-nine percent supported trimming or removing trees which could bring down power lines. Support was also shown for undertaking other measures which could reduce power outages. Nearly 20% wanted utilities to be encouraged to bury existing electric and cable lines and nearly 18% wanted to see electric and cable lines installed underground in new developments.

Concern for the needs of vulnerable populations was also strongly supported. Over thirty percent of respondents selected “Contact and assist the elderly and others with special needs in the event of natural disasters.” Also, 17% of respondents wanted municipalities to “Encourage nursing homes, senior housing, and group homes to install back-up generators.” Responses to the open ended Question 7, which asked respondents to identify vulnerable areas, buildings, structures, and groups of people, showed overwhelming concern for vulnerable populations. At least 44 of the 68 responses to this question identified vulnerable people such as the elderly, disabled, and others with medical or special needs in their communities. The need for sheltering pets was also expressed by a number of respondents to this question.

There was not as strong support expressed for a number of measures which could mitigate natural hazards. Less than one-sixth of respondents felt their municipality should fix drainage problems that

cause flooding on roads; keep development out of environmentally sensitive areas; strengthen development regulations; improve mapping to identify vulnerable areas; or ensure that dams are inspected and maintained. Even fewer expressed a concern for analyzing snow loads on buildings or the potential for wild fires; acquiring and removing buildings subject to repeated flooding; identifying buildings susceptible to earthquake damage; or encouraging residents and businesses to purchase flood insurance or flood proof their buildings. No one expressed a need for their municipality to consider enacting a drought ordinance.

Certainly our experiences over the past few years with prolonged power outages and blocked roads due to Storms Irene, Alfred, and Sandy, as well as the Blizzard of February 2013, colored the survey takers responses. Also, the lack of recent widespread experience locally with drought, wild fire, and earthquakes influenced responders' choices. However, the perceived lack of support for some measures should also be tempered by the fact that survey takers were limited to selecting only five of 24 listed measures. This limitation required responders to prioritize measures without the ability to indicate a ranking among the various measures.

Survey respondents were also given the opportunity to identify additional measures not included in the list of twenty-four measures or to highlight additional choices from the list they were not able to select. These additional measures are listed in the full survey results which are presented in more detail in the Appendix. Survey takers were also asked to identify specific areas, facilities or groups of people particularly vulnerable to natural hazards. Reponses indicated a strong concern for the elderly, disabled, and those with special and/or medical needs. The survey results report in the Appendix lists all responses to this question.

Survey takers were also asked about the use of emergency shelters. Forty-two of 147 respondents indicated they had used a local shelter. Of these 42 respondents, 27 or 64% used a local shelter for charging a cell phone or laptop; 19 or 45% obtained meals at a shelter; 17 or 40% showered at a shelter; and six or 14% slept overnight at a shelter. The survey also asked respondents if they needed to go to a shelter in the event of a natural disaster, would they be willing to go to a multi-town shelter. One hundred thirty-one people responded to this question. Overall, there was a strong support for the use of multi-town shelters. Ninety-six or 73% expressed a willingness to use a multi-town shelter; 35 or 27% said they would not be willing to go to a multi-town shelter.

Survey results were provided to municipal representatives for their use in updating municipal sections.

Public Meetings - Upon completion of a draft hazard vulnerability analysis and initial meetings with local officials, CRCOG staff conducted several public meetings in the spring and summer of 2013 (listed below) to solicit feedback from residents and other stakeholders. CRCOG sent meeting notices to various municipal officials including chief elected officials, school superintendents, public housing authorities, planning and zoning commission chairs, CERT leaders, as well as to local libraries, hospitals, colleges, chambers of commerce, news media, utilities, the Red Cross, abutting towns, congressional offices, state senators and representatives, and community organizations. Meeting notices and summaries were also posted on the CRCOG website. Each town was also asked to advertise the meeting. Town outreach included postings on municipal websites, press releases, e-mail distributions, announcements at other local public meetings, among other means. Formal attendance was not taken at these meetings, however, over 53 residents, legislative representatives, members of the press and

other local stake holders attended this series of meetings. In addition, over fifty municipal and school representatives attended. Below are brief summaries of each of the seven subregional meetings. More detailed meeting summaries can be found in the Appendix.

Sub-region: **Farmington River Watershed - Avon, Canton, Farmington, Simsbury**
Date: June 10, 2013; 6 pm – 8:30pm
Location: Farmington Police Department Community Room
Meeting Highlights: Ten members of the public attended: three residents of Avon, one resident of Canton, one state senator, two congressional staff persons and two members of the press. Public comment focused on dealing with power outages, notifying the public in times of emergency, and sheltering issues.

Sub-region: **South East - Andover, Bolton, Hebron, Marlborough**
Date: June 17, 2013, 7 pm – 8:30 pm
Location: Hebron's Gilead Hill Elementary School
Meeting Highlights: Three members of the public attended: two residents of the Amston section of Hebron and an unidentified man. Public comment focused on expanding volunteer participation, sheltering issues and storm clean up and tree trimming efforts

Sub-region: **Connecticut River North - East Granby, Granby, Suffield**
Date: July 1, 2013, 7 pm – 8:30 pm
Location: Granby Senior Center
Meeting Highlights: Fourteen members of the public attended including at least ten residents of Granby. The meeting was taped by Granby Community Television. Public comment focused on expanding training for the public in dealing with natural disasters and ensuring means of communicating with the public during times of power outages

Sub-region: **Central West - Bloomfield, Newington, Rocky Hill, West Hartford, Wethersfield**
Date: July 2, 2013, 7pm – 8:30 pm
Location: Bloomfield Volunteer Ambulance
Meeting Highlights: Seven members of the public attended including a resident of West Hartford, two representatives from CL&P, a state senator, and a local newspaper reporter. Public comment focused on CL&P's efforts to lessen the potential for power outages and a request that municipalities be encouraged to pursue mitigation projects which are likely to qualify for grant funding.

Sub-region: Connecticut River North – Windsor, Windsor Locks, Enfield
Date: July 9, 2013, 7 pm – 7:45 pm
Location: Windsor Locks Town Hall
Meeting Highlights: Two representatives from Connecticut Light & Power attended. There was no public comment.

Sub-region: **Connecticut River South – East Hartford, Glastonbury, Hartford, Manchester, South Windsor**
Date: July 11, 2013, 7 pm – 8:15 pm
Location: Glastonbury Academy Building

Meeting Highlights: Seven members of the public attended including representatives from the press, CL&P and the Glastonbury Chamber of Commerce as well as a staff person from State Senator Gary LeBeau's office. A CL&P representative highlighted the utility's efforts to strengthen its infrastructure.

Sub-region: **North East - East Windsor, Ellington, Somers, Stafford, Tolland, Vernon**
Date: July 18, 2013, 7 pm – 8:45 pm
Location: Vernon Senior Center
Meeting Highlights: At least eleven members of the public attended including CERT team members, the press, and CL&P representatives. In addition, twenty-one representatives from municipal departments and public school systems attended. Public comment focused on the need for improved alert systems, assistance in acquisition of equipment and better coordination between municipal governments and school systems, as well as issues with the State's storm clean up and supply distribution.

Public Meeting in Farmington, June 10, 2013. Credit: CRCOG

Public Meeting in Vernon, July 18, 2013. Credit: CRCOG

Review of Draft Plan Update - To solicit public comment on the draft plan, CRCOG advertised the availability of the draft Plan Update, made presentations to local officials, and held two public input meetings. CRCOG requested that each participating municipality post on its own website, newsletter and any other appropriate media that the draft plan was available for review and comment beginning. CRCOG also notified potentially interested agencies including regional watershed groups, conservation districts, colleges, hospitals, chambers of commerce, and others. A public service announcement was provided to the Connecticut Radio Information System (CRIS), a radio reading service. Articles were placed in the September 20th and October 4th editions of the CRCOG Newsletter.

Presentations on the draft plan were made on September 17th to the Policy Board and on September 19th to the UAWG/MMRS (Urban Area Working Group/ Metropolitan Medical Response System, a subcommittee of CREPC) and to the Regional Planning Commission. At these meetings, attendees were given copies of the Executive Summary and the Municipal Plan for their respective community.

Public meetings on the draft plan update were held in the evenings at the Hartford Public Library on Tuesday, October 1, 2013 and at the Enfield Town Hall on Wednesday, October 2, 2013.These public input sessions and the availability of the draft for review and comment were advertised in *The Hartford Courant*, the *Hartford News*, and the *Journal Inquirer*. The advertisement in the *Hartford News* was also translated into Spanish. Several towns posted notices on their websites and sent out press releases. More detailed meeting summaries, newspaper and website advertisements and news articles can be found in the Appendix.

Summary of public comment received at public meetings:

October 1, 2013, Hartford Public Library, 5:30 pm – Attendance included three municipal representatives (two from Hartford and one from Glastonbury) and a resident of Hartford who requested that CRCOG assist municipalities in outreach to and involvement of those with functional needs in natural hazard mitigation efforts. As the commenter, who serves on CREPC's Regional Support Function-19 for Functional Needs Management noted, it is often difficult to develop and maintain lists of those with functional needs because registration and inclusion in a list or database is voluntary and privacy must be maintained. Involvement of persons with functional needs in mitigation activities can be also difficult for a number of reasons including the specifics of the functional need, transportation issues, and lack of personal familiarity with those undertaking the activities, among others. CRCOG staff responded that one regional objective is to, "Assist municipalities in implementing hazard mitigation strategies" and that a number of the region's municipalities have identified mitigation strategies to meet the needs of special needs populations.

After the meeting ended and attendees had left, a representative of the Connecticut Coalition for Environmental Justice entered the meeting room. CRCOG staff discussed the draft plan with her and gave her a copy of the plan document and several copies of the executive summary. She also expressed concern for those with functional needs.

October 2, 2013, Enfield Town Hall, 7:00 pm – Attendance included two residents of Enfield, the mayor of Enfield, and a reporter from *The Hartford Courant.* One resident expressed concern about flooding in the vicinity of I-91 and Route 5 and the Mayor described the Town's plans to address the issue. The other resident expressed her concern for improving outreach and community involvement regarding disaster preparedness. Mr. Perkins described some of the techniques towns and the

region are using to involve the public in disaster preparedness. She also expressed her support for and interest in low impact development (LID) techniques. Mr. Perkins said information is available on CRCOG's website. Mayor Kaupin added that information is also available on Enfield's website.

Written Comments Received**:**

The comment period was originally advertised as open until October 11, 2013; however, it was extended to October 31st to respond to requests from Hartford residents for increased opportunity for comment. The City of Hartford issued a media advisory on the extension of the public comment period. CRCOG also posted an announcement of the public comment period extension on its website. An e-mail comment was received asking if micro grids had been considered, particularly for the Town of West Hartford. In response to this comment, the Town advised that they had initiated conversations with CL&P. We were also notified that several land use boards in the Town of Simsbury had reviewed the plan update and were particularly supportive of the regional objective to improve stormwater management and groundwater recharge. No other written comments were received as of November 4, 2013.

Response to Comments Received**:**

In response to the request for regional assistance to communities for outreach to persons with functional needs, the ESF-5 Planning Committee members were asked to consider the addition of a regional mitigation action to "*Assist member communities in efforts to develop and maintain lists of functional needs populations and in improving involvement of functional needs persons in planning and training for hazard mitigation."* The committee agreed to amend the regional mitigation strategy to add this additional action. The draft plan update was also revised to incorporate a brief description of the State's grant program for micro grids and a description of resources for planning and responding to the needs of vulnerable populations into the Resources section.

Coordination with Neighboring Communities and Other Agencies

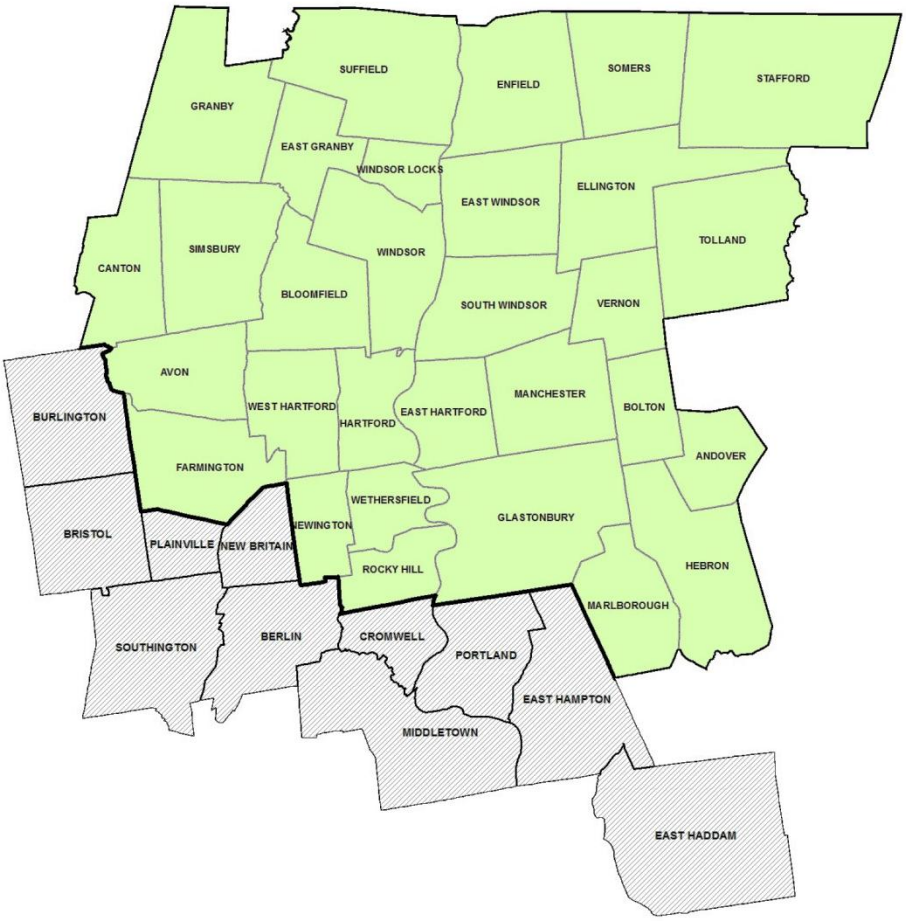
Opportunities for input from neighboring communities and other regional bodies were provided throughout the update process. The Capitol Region Emergency Planning Committee (CREPC) which represents all thirty of the CRCOG municipalities contributing to this multi-jurisdictional plan plus eleven other neighboring communities in Connecticut was regularly briefed on plan update activities. CREPC member communities correspond to the DEMHS Region 3 communities. The map which follows shows the CRCOG communities in green and the additional CREPC/DEMHS Region 3 communities in white.

CREPC's Emergency Support Function 5 – Emergency Management serves as the basis for the planning committee which provides oversight to the Plan Update process. Outreach for the planning committee meetings included ESF-5 members from communities outside CRCOG as well as other regional agencies. Attendance at the February 2013 planning committee meeting included representatives from the neighboring communities of New Britain and Portland as well as representatives from DEMHS, FEMA and the MDC. (The MDC, or Metropolitan District Commission, is a regional water and wastewater agency serving Hartford and neighboring municipalities.) Attendance at the ESF-5 meeting of October 22, 2013, included a representative from Middletown and Portland. In

addition, other regional natural hazard mitigation plans, as well as the state plan were reviewed during the preparation of this plan update.

CRCOG staff also staffed a booth at the Hartford Springfield Economic Partnership (HSEP) "State of the Region" Conference in Windsor, Connecticut on June 7, 2013, and provided materials describing the update planning process. The HSEP, also known as New England's Knowledge Corridor, is an interstate partnership of regional economic development, planning, business, tourism and educational institutions from throughout the Hartford, Springfield and New Haven metropolitan areas. The website for the Sustainable Knowledge Corridor, a partnership of three regional planning agencies, CRCOG, the Pioneer Valley Planning Commission (PVPC) in Massachusetts, and Central Connecticut Regional Planning Agency (CCRPA), as well as a consortium of some thirty diverse organizations which evolved from associations formed through the HSEP, includes a link to CRCOG's natural hazards mitigation planning web page: http://www.sustainableknowledgecorridor.org/site/content/climate-natural-hazards.

Map 70: CRCOG and CREPC Municipalities



Municipal planners or other local representatives in communities adjacent to CRCOG, including those in Massachusetts, were e-mailed notices of the subregional public meetings held in June and July of 2013. Representatives of other regional bodies were also e-mailed these meeting notices including CL&P (Connecticut Light & Power, the regional electric utility), MDC, Red Cross, chambers of commerce, regional health districts, and community organizations. Multiple news media representatives were also notified of each public meeting. Although formal attendance was not taken at these meetings, representatives from CL&P attended six of the seven meetings and a Red Cross volunteer leader and representatives of a U.S. Congresswoman attended a meeting. Input from those outside the thirty CRCOG municipalities was also obtained through the online survey. Notices of the subregional meetings included links to the survey. Of the 147 respondents to the survey, eight were from outside the region.

Outreach to organizations outside the Capitol Region and to regional organizations to announce the availability of the draft plan and public input meetings was similar to that of the subregional meetings. Municipal planners or other local representatives in communities adjacent to CRCOG including those in Massachusetts; representatives of regional bodies including utilities, regional planning agencies, the Red Cross, chambers of commerce, regional health districts, and community organizations; and multiple news media representatives were e-mailed notices of the October public meetings.

Section VI: Plan Implementation and Maintenance

Bringing the Plan to Life

This section describes how this Plan Update will be put into action and how our momentum will be maintained. A Natural Hazards Mitigation Plan is not solely a document but also represents a cyclical process. Revisiting the planning process periodically ensures the mitigation strategies are not overlooked even if there are personnel transitions or organizational changes. Each update process helps to build and strengthen institutional capacity to undertake our mitigation strategies. All projects/ activities will be evaluated for their progress and effectiveness and feasibility as mitigation activities during the current 5-year cycle (2014-2019) and as work on the next update of this plan is undertaken.

Figure 11: Core Steps in Mitigation Planning Process

Source: http://www.fema.gov/hazard-mitigation-planning-overview

The general schedule and process we will follow to ensure the Capitol Region's 2014-2019 Plan Update is implemented and maintained involves the following steps:

TASK	2014				2015				2016				2017				2018			
2014-2019 Plan Approval & Adoption																				
FEMA Review & Approval	●	●																		
Local & Regional Adoption		●	●	●																
Plan Distribution		●	●	●																
Implementation Monitoring																				
Annual Status Updates						●				●				●				●		
Initiate Update Process																				
Seek Grant Funding							●													
Policy Board Approval							●													

TASK	2014				2015				2016				2017				2018			
Municipal Commitments							●													
Develop Next Plan Update																				
Risk Assessment Update											●	●	●	●	●	●				
Mitigation Strategies Update													●	●	●	●	●	●		
Document Preparation, Review & Revision														●	●	●	●	●	●	●
Public Outreach & Participation																				
ESF-5 Plan Related Meetings		●				●				●				●				●		
Plan Update Activities											●	●	●	●	●	●	●	●	●	●

Questions or comments regarding the implementation of this Plan Update should be directed to:

Lynne Pike DiSanto, AICP
Senior Planner and Policy Analyst
Capitol Region Council of Governments
241 Main Street, 4th Floor
Hartford, Connecticut 06106
(860) 522-2217 ext. 211
lpikedisanto@crcog.org

Plan Adoption

This plan update was submitted for review by the State of Connecticut Department of Energy and Environmental Protection in November of 2013. Suggested revisions were made and the State transmitted the Plan Update to FEMA for review in December 2013. FEMA's approval pending adoption was requested. Upon receipt of FEMA's conditional approval, each municipality's governing body as well as CRCOG's Policy Board will need to formally adopt the Plan Update. CREPC will also be asked to append this plan to the Regional Emergency Support Plan (RESP) Plan. Copies of the CRCOG and municipal adoption resolutions will be included in the Appendix when available.

The Town of West Hartford adopted the draft plan update on October 22, 2013 to fulfill requirements for its continued participation in the Community Rating System.

Strategy Implementation

Implementation of the strategies contained within this plan will depend largely on the availability of resources. Each municipality and CRCOG will have to consider the costs, availability of funding, and economic and other impacts of each mitigation action individually. In general, preference should be given to accomplishing tasks that have positive benefit-cost ratios, and those that are ranked high priority. The ground work has been set for initiating the proposed mitigation activities: responsible

agencies, implementation time frames, and potential funding sources have been identified for each proposed action.

The municipalities' chief executive officials will be responsible for making this plan available to all municipal departments and agencies as a planning tool to be used in conjunction with other municipal plans, regulations, budgets, capital improvements programs, day-to-day operations, and other processes and projects. The CRCOG Policy Development & Planning Department will be responsible for regional strategies and coordination with CRCOG Public Safety staff. CRCOG will also assist municipalities' efforts to implement local projects by notifying municipal officials of grant funding opportunities as we become aware of them and by writing letters of support for grant applications.

It is also CRCOG's intention to append this plan to the Regional Emergency Support Plan (RESP) Plan, upon formal approval by FEMA and adoption by member municipalities. As municipal plans of conservation and development (POCD) are prepared and referred to CRCOG for regional review, the Policy Development & Planning staff will make recommendations for opportunities to incorporate natural hazards mitigation planning into the POCD. CRCOG has made such comments regarding municipal plans of conservation and development reviewed in 2013 and 2014. The regional plan of conservation and development which is currently being updated will also incorporate natural hazards mitigation policy recommendations.

Implementation Monitoring

The planning sub-committee of CREPC (ESF-5), which provided guidance to this project, will monitor progress on its implementation with assistance from CRCOG staff. The sub-committee will conduct annual outreach to municipalities to ascertain progress on proposed mitigation actions. This will be conducted in an annual meeting for review and evaluation of the plan and its implementation. The annual meetings are proposed to be conducted in the spring or summer to allow municipalities the opportunity to prepare for annual federal disaster mitigation grant applications. We will reach out to the primary municipal contacts involved in this update (see below) for status updates on mitigation activities. Additionally, CRCOG Public Safety and Policy Development & Planning staff will also coordinate with ESF-5 to ensure that all potentially interested municipal officials, including emergency management, public safety, public works and administrative staff, are invited to the meeting at which this plan will be reviewed. At the meeting, each municipality will review hazards that occurred in the previous years, strategic actions that have been implemented and additional efforts that have been undertaken to mitigate the impacts of natural hazards. The CREPC ESF-5 meetings are publicly noticed meetings and the public will be notified of the meetings and afforded the opportunity to participate.

Table 29: Natural Hazards Mitigation Plan Update Primary Municipal Contacts

TOWN	NAME	POSITION	ADDRESS	PHONE	E-MAIL
Andover	Robert Burbank	First Selectman	17 School Road Andover 06232	860-742-7305	andoverselectman1@comcast.net
Avon	James DiPace	Emergency Management Director	60 West Main St. Avon 06001	860-409-4300	jdipace@town.avon.ct.us

TOWN	NAME	POSITION	ADDRESS	PHONE	E-MAIL
Bloomfield	John Lawlor	Public Works Director	800 Bloomfield Ave Bloomfield 06002	860-243-1483	jlawlor@Bloomfieldct.org
Bolton	Joyce Stille	Administrative Officer	222 Bolton Center Rd. Bolton 06043	860-649-8066 x111	joyce.stille@boltonct.org
Canton	Adam Libros	Emergency Management Director	4 Market St. PO Box 168 Collinsville 06022	860-693-7857x1	alibros@townofcantonct.org
East Granby	Gary Haynes	Director of Community Development	9 Center St. P.O. Box 1858 East Granby 06026	860-653-3444	garyh@egtownhall.com
East Hartford	Marcia Leclerc	Mayor	740 Main St East Hartford 06108	860-291-7200	mleclerc@easthartfordct.gov
East Windsor	Roger Hart	Deputy Police Chief	25 School St PO Box 477 East Windsor 06088	860-292-8240	hartr@eastwindsorpd.com
Ellington	Lisa Houlihan	Town Planner	55 Main St PO Box 187 Ellington 06029	860-870-3120	rphillips@ellington-ct.gov
Enfield	Charles Grasso	Emergency Management Director	820 Enfield St. Enfield 06082	860-253-6350	cgrasso@enfield.org
Farmington	Paul Melanson	Police Chief	319 New Britain Ave Unionville 06085	860-6752454	melansonp@farmington-ct.org
Glastonbury	Michael Bisi	Superintendent of Sanitation	2155 Main St PO Box 6523 Glastonbury 06033	860-652-7774	mike.bisi@glastonbury-ct.gov
Granby	Francis Armentano	Director of Community Development	15 North Granby Rd. Granby 06035	860-653-8945 860-844-5318	farmentano@granby-ct.gov
Hartford	Carlos Huertes	Fire Chief/Asst EMD	253 High St Hartford 06103	860-757-4502	HuerC001@hartford.gov
Hebron	William Kramer	Emergency Management Director	15 Gilead St Hebron 06248	860-951-5676	wkramer@hebronct.com oem@hebronct.com
Manchester	Mark Pellegrini	Director of N'hood Services & Economic Development	PO Box 191 Manchester 06045	860-647-3044 860-647-3043	markp@manchesterct.gov
Manchester	Matt Bordeaux	Environmental Planner	PO Box 191 Manchester 06045	860-647-3288	mbordeaux@manchesterct.gov

TOWN	NAME	POSITION	ADDRESS	PHONE	E-MAIL
Manchester	Donald Janelle	Deputy Director Emergency Mgmt	75 Center Street Manchester 06040	860-647-5259 860-647-5259	djanelle@manchesterct.gov Djanelle@snet.net
Marlborough	Judy Ceramicoli	Administrative Assistant	26 North Main St Marlborough 06447	860-295-6202	firstoffice@marlboroughct.net
Newington	Christopher Schroeder	Fire Chief/EMD	1485 Main Street Newington 06111	860-667-5900	cschroeder@newingtonct.gov
Rocky Hill	Ray Carpentino	Economic Development Dir.	176 Old Main St. Rocky Hill 06067	860-258-7717	rcarcarpentino@ci.rocky-hill.ct.us
Simsbury	Richard Sawitzke	Town Engineer	933 Hopmeadow St PO Box 495 Simsbury 06070	860-658-3260	rsawitzke@simsbury-ct.gov
Somers	Jeffrey Bord	Dir. Of Public Works/Town Engineer	600 Main St. PO Box 308 Somers 06071	860-763-8218	jbord@somersct.gov
South Windsor	Fred Shaw	Superintendent, Pollution Control	1540 Sullivan Avenue South Windsor 06074	860-644-2511 x 247	fred.shaw@southwindsor.org
Stafford	Dennis Milanovich	Town Engineer/Building Official	Warren Memorial Town Hall 1 Main St Stafford Springs 06076	860-684-1775	buildingofficial@staffordct.org
Suffield	Bill Hawkins	Town Planner	230C Mountain Rd. Suffield 06078	860-668-3848	bhawkins@suffieldtownhall.com
Tolland	John Littell	Dir Public Safety/Fire Chief	21 Tolland Green Tolland 06084	860-871-3677	jlittell@tolland.org
Vernon	Michael Purcaro	Emergency Management Director	55 West Main St. Vernon 06066	860-993-5878	mpurcaro@vernon-ct.gov
West Hartford	Gary Allyn	Fire Chief/EMD	95 Raymond Rd. West Hartford 06107	860-561-8300	gsallyn@westhartford.org
Wethersfield	Michael Turner	Dir Public Works/Town Eng	505 Silas Deane Highway Wethersfield 06109	860-721-2850	mike.turner@wethersfieldct.com
Windsor	Paul Goldberg	Fire Administrator	275 Broad St Windsor 06095	860-285-1983	goldberg@townofwindsorct.com
Windsor Locks	Jennifer Rodriguez	Town Planner	50 Church St Windsor Locks 06096	860-627-1447 x322	jrodriguez@wlocks.com

Plan Updates

It is anticipated that CRCOG Policy Development & Planning staff in coordination with Public Safety & Homeland Security staff will make updates to the plan at least once every five years. We will seek grant assistance for the update approximately three years prior to the expiration of this update, anticipating that the next update will take about two years to complete. We will initiate the next update process upon approval of the CRCOG Policy Board and will request commitments from each municipal chief executive official agreeing to participate in the update process. We anticipate CRCOG staff will work with municipal groups similar to those convened for the development of the current plan, when making updates. In developing our work program for the next update, we will review our experiences in this update process to identify areas or procedures which can be improved upon. All monitoring and updating activities will incorporate public involvement through open meetings, public notices, posting documents on CRCOG's website and providing ample opportunities for public comment.

Section VII: References

References

Boston College, Weston Observatory, http://www.bc.edu/content/bc/research/westonobservatory/northeast.html

Capitol Region Council of Governments, *Achieving the Balance: A Plan of Conservation and Development for the Capitol Region,* http://www.crcog.org/community_dev/regional_plan.html

Capitol Region Council of Governments, *2014-2024 Capitol Region Plan of Conservation and Vibrant. Green. Connected. Competitive,* http://www.crcog.org/community_dev/regional_plan.html

Capitol Region Council of Governments, *Capitol Region Pre-Disaster Natural Hazard Mitigation Plan*, 2008, http://www.crcog.org/community_dev/current_p_fema.html

Connecticut Council on Environmental Quality, *Environmental Quality in Connecticut, 2012*, March 2013, http://www.ct.gov/ceq/cwp/view.asp?a=4361&q=513470

Connecticut Department of Economic and Community Development, *Annual Housing Inventory by Town,* http://www.ct.gov/ecd/cwp/view.asp?a=1106&q=250640

Connecticut Department of Economic and Community Development, State Historic Preservation Office, http://www.ct.gov/cct/cwp/view.asp?a=3948&q=293806&cctNav=|

Connecticut Department of Energy and Environmental Protection, Natural Diversity Data Base (NDDB) Maps, http://www.ct.gov/deep/cwp/view.asp?a=2702&q=323464&deepNav_GID=1628

Connecticut Department of Energy and Environmental Protection, *Connecticut's 2010 Natural Hazard Mitigation Plan Update*. http://www.ct.gov/deep/lib/deep/water_inland/hazard_mitigation/2010_nhmp.pdf

Connecticut Department of Energy and Environmental Protection and Division of Emergency Services and Public Protection, *2013 Connecticut Natural Hazard Mitigation Plan Update*. http://www.ct.gov/deep/cwp/view.asp?a=2720&q=325648&deepNav_GID=1654

Connecticut Department of Energy & Environmental Protection, Dams, http://www.ct.gov/deep/cwp/view.asp?a=2720&q=325634&deepNav_GID=1625

Connecticut Department of Energy & Environmental Protection, High Hazard & Significant Hazard Dams in Connecticut, http://www.ct.gov/deep/cwp/view.asp?a=2720&q=394032&deepNav_GID=1625

Connecticut Department of Energy & Environmental Protection, GIS Data http://www.ct.gov/deep/cwp/view.asp?a=2698&q=322898&deepNav_GID=1707%20

Connecticut Flood Recovery Committee, *Report of the Connecticut Flood Recovery Committee to Governor Abraham Ribicoff*, November 3, 1955, Connecticut State Library, http://www.cslib.org/floodrecov.pdf

Connecticut Office of Policy & Management, Municipal Fiscal Indicators, http://www.ct.gov/opm/cwp/view.asp?a=2984&q=383170&opmNav_GID=1807

Connecticut Secretary of the State, *Connecticut State Register & Manual, 2011*, http://www.sots.ct.gov/sots/cwp/view.asp?a=3188&q=392636

Federal Emergency Management Agency, Disaster Declarations, http://www.fema.gov/disasters

Federal Emergency Management Agency, National Flood Insurance Program, *Community Rating System, A Local Official's Guide to Saving Lives, Preventing Property Damage, Reducing the Cost of Flood Insurance. http://www.fema.gov/media-library/assets/documents/16104?id=3655*

FEMA *Local Mitigation Planning Handbook*, 2013, http://www.fema.gov/library/viewRecord.do?id=4225

FEMA, *Local Multi-Hazard Mitigation Planning Guidance*, July 1, 2008.

Federal Emergency Management Agency, *Community Status Book Report – Connecticut*, http://www.fema.gov/cis/CT.html

Hazus®-MH MR5 Technical Manuals and User's Manuals, http://www.fema.gov/library/viewRecord.do?id=4454

The Metropolitan District (MDC), Clean Water Project, http://www.thecleanwaterproject.com/

National Climatic Data Center (NCDC), Storm Events Database, http://www.ncdc.noaa.gov/stormevents/

National Drought Mitigation Center, University of Nebraska-Lincoln, http://drought.unl.edu/

National Institute of Building Sciences, Multihazard Risk Assessment/HAZUS, *About Hazus*, http://www.nibs.org/?page=hazus&hhSearchTerms=about+and+hazus

National Oceanic and Atmospheric Administration, National Climatic Data Center, http://www.ncdc.noaa.gov/

National Weather Service, National Hurricane Center, http://www.nhc.noaa.gov

National Weather Service, Storm Prediction Center, http://www.spc.noaa.gov

Region 3, Regional Emergency Support Plan, October 2009, http://www.crcog.org/homeland_sec/plan.html

State of Connecticut Water Status, http://ct.gov/waterstatus/site/default.asp

The Tornado Project, http://tornadoproject.com/

University of Connecticut, Center for Land Use Education and Research, Connecticut's Changing Landscape, Download Data, http://clear.uconn.edu/projects/landscape/download.asp

University of Connecticut Map and Geographic Information Center (MAGIC), Connecticut GIS Data, http://magic.lib.uconn.edu/connecticut_data.html

U.S. Army Corps of Engineers, Flood Risk Management Program, http://www.iwr.usace.army.mil/Missions/FloodRiskManagement/FloodRiskManagementProgram.aspx

U.S. Army Corps of Engineers, National Levee Database, http://nld.usace.army.mil

U.S. Census Bureau, http://www.census.gov/

USGS Earthquakes Hazards Program, Connecticut Earthquake Information, http://earthquake.usgs.gov/earthquakes/states/?region=Connecticut

USGS Geologic Hazards Science Center, https://geohazards.usgs.gov/ and "2009 Earthquake Probability Mapping", https://geohazards.usgs.gov/eqprob/2009/index.php

USGS, New England Water Science Center – Connecticut Office, http://ct.water.usgs.gov/

Vermont Agency of Natural Resources, River Management Program, *Municipal Guide to Fluvial Erosion Hazard Mitigation*, www.anr.state.vt.us/dec/waterq/rivers/docs/rv_**municipalguide**.pdf

Wikipedia, http://en.wikipedia.org/wiki/Main_Page

Municipal Websites

(For most municipalities, plans of conservation and development; zoning, inland wetlands and floodplain regulations; annual budgets; and capital improvements programs can be found on municipal websites.)

Andover, http://andoverct.org/
Avon, http://www.town.avon.ct.us/Public_Documents/index
Bloomfield, http://www.bloomfieldct.org/Plugs/home.aspx
Bolton, http://www.bolton.govoffice.com/
Canton, http://www.townofcantonct.org/
East Granby, http://www.eastgranbyct.org/
East Hartford, http://easthartfordct.gov/Public_Documents/index
East Windsor, http://www.eastwindsor-ct.gov/Public_Documents/Home
Ellington, http://www.ellington-ct.gov/Plugs/homepage.aspx
Enfield, http://www.enfield-ct.gov/
Farmington, http://www.farmington-ct.org/
Glastonbury, http://www.glasct.org/index.aspx?page=1
Granby, http://www.granby-ct.gov/Public_Documents/index
Hartford, http://www.hartford.gov/
Hebron, http://www.hebronct.com/
Manchester, http://www.townofmanchester.org/
Marlborough, http://www.marlboroughct.net/index.php

Newington, http://www.newingtonct.gov/
Rocky Hill, http://www.rockyhillct.gov/
Simsbury, http://www.simsbury-ct.gov/
Somers, http://www.somersct.gov/
South Windsor, http://www.southwindsor.org/Pages/index
Stafford, http://www.staffordct.org/
Suffield, http://www.suffieldtownhall.com/
Tolland, http://www.tolland.org/
Vernon, http://www.vernon-ct.gov/
West Hartford, http://www.west-hartford.com/
Wethersfield, http://wethersfieldct.com/
Windsor, http://www.townofwindsorct.com/
Windsor Locks, http://www.windsorlocksct.org/

Regional Planning Agency Websites

Capitol Region Council of Governments, http://www.crcog.org
Central Connecticut Regional Planning Agency, http://www.ccrpa.org/
Windham Region Council of Governments, http://www.wincog.org/
Southeastern Connecticut Council of Governments, http://www.seccog.org/documents.html
Lower Connecticut River Valley Council of Governments, http://www.rivercog.org/
Pioneer Valley Planning Commission, http://www.pvpc.org/
New England's Sustainable Knowledge Corridor, http://www.sustainableknowledgecorridor.org/site/